UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

SEP 26 2001

In Reply Refer To:
SWR-00-SA-0148:FKF

Mr. Michael G. Ritchie
U.S. Department of Transportation
Federal Highways Administration
California Division
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Dear Mr. Ritchie:

Enclosed is a biological opinion (Enclosure 1) prepared pursuant to section 7 of the Endangered Species Act which analyzes impacts to threatened Central Valley steelhead (*Oncorhynchus mykiss*), threatened Central Valley spring-run chinook salmon (*O. tshawytscha*), and their critical habitat resulting from the proposed Route 70 Upgrade project. Also, as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the National Marine Fisheries Service's (NMFS) Essential Fish Habitat (EFH) Conservation Recommendations for Pacific coast salmon are enclosed (Enclosure 2).

Endangered Species Act Consultation

Based on the best available scientific and commercial information, NMFS concludes that the proposed project is not likely to jeopardize the continued existence of Central Valley steelhead or spring-run chinook salmon or result in adverse modification of their critical habitat. An Incidental Take Statement is included with the biological opinion that identifies Reasonable and Prudent Measures and Terms and Conditions to implement those measures, to ensure that the impacts of any incidental take are minimized.

Consultation with NMFS must be reinitiated if (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals that the project may affect listed species in a manner or to an extent not previously considered; (3) the action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion; or (4) a new species is listed, or critical habitat is designated that may be affected by the project.

Essential Fish Habitat Consultation

NMFS has provided EFH Conservation Recommendations for Pacific salmon. FHWA has a statutory requirement to submit a detailed response in writing to NMFS that includes a description of measures proposed for avoiding, mitigating, or offsetting the impact of the activity on EFH, as required by section 305(b)(4)(B) of the MSFCMA and 50 CFR 600.920(j) within 30 days. If unable to complete a final response within 30 days of final approval, FHWA should provide NMFS an interim written response within 30 days. FHWA should then provide a detailed response.

If you have any questions about this consultation please contact Ms. F. Kelly Finn in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Ms. Finn may be reached by telephone at (916) 930-3600 or by Fax at (916) 930-3629.

Sincerely,

R. Lent

Rebecca Lent, Ph.D.
Regional Administrator

cc: NMFS-PRD, Long Beach, CA
Stephen A. Meyer, ASAC, NMFS, Sacramento, CA

Enclosure 1

BIOLOGICAL OPINION

AGENCY: U.S. Department of Transportation
Federal Highway Administration

ACTIVITY: Funding the Expansion of California State Route 70

CONSULTATION
CONDUCTED BY: National Marine Fisheries Service, Southwest Region

DATE ISSUED: SEP 26 2001

This document represents the National Marine Fisheries Service (NMFS) biological opinion (Opinion) based on our review of information provided by the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans) for the proposed State Route 70 Highway Upgrade Project in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.).

CONSULTATION HISTORY

The following is a chronological listing of pertinent events in the consultation:

May 11, 2000. National Marine Fisheries Service received a package from the U.S. Department of Transportation, Federal Highway Administration (FHWA) requesting formal consultation under Section 7 of the ESA.

July 5, 2000. NMFS requested additional information necessary to complete the Section 7 consultation process and requested information regarding the indirect, interrelated, and cumulative effects of FHWA's proposed project including the growth inducing effects.

September 14, 2000. FHWA responded to our request for more information with a letter stating that the FHWA and Caltrans disagree with the assumption that expansion of State Route 70 will have growth inducing effects and did not address this subject further.

March 8th and 19, 2001. Meetings were held between Caltrans, FHWA, representatives from local and county administrations, and the U.S. Fish and Wildlife Service (USFWS) and NMFS, respectively, to discuss alternative solutions to the issues related to interrelated, cumulative, and interdependent effects. Development of an Habitat Conservation Plan, coordinated between Sutter County, Yuba County, Sacramento Council of Governments (SACOG), Caltrans, FHWA, USFWS, and NMFS, was discussed and agreed upon. The HCP will address the growth-inducing effects of the Route 70 Upgrade project and additional related projects. Implementation of the HCP is intended to protect listed species and their critical habitats from the effects of growth and development within Sutter and Yuba counties. As part of this process an interim plan was agreed to be developed and implemented during the time period before the HCP is completed and signed.

May 16, 2001. A field site visit was conducted with personnel from Caltrans, USFWS, and NMFS in attendance. During the site visit NMFS expressed the need for additional information from FHWA and Caltrans in order to analyze the effects of the proposed project.

May 17, 2001. NMFS received additional information about the Storm Water Pollution Prevention Plan (SWPPP) associated with bridge construction as part of the project, and additional information on the riparian revegetation plan.

May 25, 2001. Caltrans provided some additional information on the bridge site including a map of the site.

June 7, 2001. NMFS requested a written description of the project's construction plans as depicted in the map.

July 3, 2001. A meeting was held between NMFS, Caltrans, Yuba County, and Sutter County to discuss information needs, indirect effects of future or ongoing projects, and the HCP process. Caltrans provided us with a report on growth associated with the project.

The following biological opinion is based on information provided in the April 2000 Biological Assessment; the September 1999 Draft Environmental Impact Report/Statement; telephone conversations with Jennifer Gillies, Sean Penders, and Chris Collinson of Caltrans; site visits with agency personnel; and other sources of information. A complete administrative record of this consultation is on file at the NMFS, Sacramento Area office.

DESCRIPTION OF THE PROPOSED ACTION

The FHWA proposes to provide Caltrans funds to upgrade a 15.5 mile segment of State Route (SR) 70 from a two-lane to a four-lane freeway in order to accommodate heavy traffic. This project proposes to reduce traffic delays and congestion, improve safety, and to initially provide expressway and ultimately freeway access to the Marysville /Yuba City area by upgrading the existing 2 lane highway on SR 70 south of Marysville to a four lane expressway from the 99/70 intersection to 0.3 mile south of the McGowan Parkway overcrossing. Additionally, the project would provide right-of-way for future growth (Caltrans Conceptual Storm Water Pollution Prevention Plan, 2001). This project is one part of Caltrans' goal to provide overall improvement of the Sacramento to Chico corridor. This goal also includes completion of the

Marysville to Oroville freeway upgrade (called the Marysville Bypass project, environmental documentation is currently being prepared for this project) and State Route 149 highway project (an EIR/EIS is currently being prepared). A 1990 report entitled *State Routes 70 and 99 Corridor Study*, prepared by the Sacramento Area Council of Governments (SACOG) and the Butte County Association of Governments (BCAG), selected Route 70 as the "major highway in the 70/99 corridor." A listing of State Highway projects recommended by the Corridor Study is shown in Table 1 and a map of the proposed projects is shown in Figure 1.

The proposed Route 70 Freeway Upgrade Project, located at the southern end of the Route 70/99 transportation corridor, is in southern Sutter and western Yuba counties. The 24.5 kilometer (15.5 mile) project corridor is located on Route 70 between Route 99 and a point 1.3 kilometers (0.8 mile) south of McGowan Parkway in Olivehurst, where it ties into an existing freeway facility. The two lane segment proposed for expansion is sandwiched between four-lane expressways both north and south of the project limits. Through the NEPA process, several alternatives were considered and analyzed resulting in selection of a preferred alternative, which was also identified as the least environmentally damaging practicable alternative to wetlands and sensitive species.

The proposed Route 70 improvements include an upgrade of the existing two-lane highway/expressway to a four-lane expressway and eventual four-lane freeway to accommodate increasing traffic throughout the corridor. Full build out of the freeway would include four interchanges located at Striplin Road, East Nicolaus Avenue, Berry/Kempton Road, and Feather River Boulevard. A separate project proposed by Yuba County includes an additional interchange at Plumas Arboga/Algodon Road to accommodate local traffic. FHWA has not yet initiated Section 7 consultation on the county interchange project.

The proposed freeway upgrade project would primarily use the existing route as the southbound lanes and construct two new lanes for the northbound direction. The freeway would consist of two new lanes east of the existing highway from the 70/99 split to Striplin Road. Then utilizing the existing Route 70 for southbound lanes, two new lanes would be added for northbound traffic up to Marcum Road. A two-lane frontage road would be constructed to the east of the new northbound lanes to accommodate local traffic. From Marcum Road, four lanes would be constructed that would swing west, bypassing the town of East Nicolaus and then returning to the west side of the existing highway around Cornelius Avenue.

North of Cornelius Avenue, two new lanes would be constructed to the west of the existing highway, and then transition back to the east side of the existing roadway at the Bear River Bridge. El Centro Boulevard would continue to serve as a frontage road to the east. A second bridge would be constructed across the Bear River to the east and the existing bridge would be widened including shoulders to meet current design standards. The alignment would continue north with two new lanes on the east side of the existing highway.

The project is broken into three phases and construction would begin in 2002 for Phase 1 and 2004 for phases 2 and 3. Phase 1 extends from just north of the Feather River Boulevard interchange to the northern terminus. Phase 2 begins from the southern terminus extends around East Nicolaus and ends just north of Cornelius Road. Phase 3 is between phases 1 and 2 and includes Berry/Kempton Road area and the crossing over Bear River.

Work Within Rivers and Streams

The proposed project would include construction of a second bridge that would be similar to the existing Route 70 bridge over the Bear River. The existing Bear River bridge has been in place for 35 years and is 465 meters (1524 ft.) long, 10.29 m. (33.75 ft.) wide, with a cast in place concrete T-beam structure with 24 spans, 20 bents with five pile/columns each, and three pier walls on pile footings. The new bridge would span the river floodplain, including Yankee Slough, from levee to levee (see attached Figure 2). The proposed freeway upgrade and bridge construction would occur to the east, north of Bear River and to the west, south of Bear River. South of the Bear River existing Route 70 would become the southbound lanes and new lanes constructed on the east side would become the northbound lanes. Work on existing Route 70 within the segment immediately south of the Bear River Bridge would be limited to an overlay within the existing roadway embankment and would not encroach on the Bear River and designated critical habitat to the west. From just north of Berry/Kempton Road to Cornelius Avenue, the southbound lanes would be constructed west of existing Route 70.

In addition to construction of a second bridge, the existing bridge would be widened including shoulders to meet current design standards. At the Bear River crossing(s), work within and adjacent to the active channel of the Bear River would occur during construction of bridge columns; however, work would be limited to construction windows (June 1 - October 15) during low flow when salmonids would not likely be in the project area. Caltrans biologists would provide assistance to their highway and structures design staff and recommend that the new bridge span the active channel (i.e., limit new pier construction in the active channel) to limit any obstruction to fish passage per NMFS' "Guidelines for Salmonid Passage at Stream Crossings" (NMFS 2000).

Work within 10 m. of either side of the new structure and within 10 m. of the new west edge of the existing bridge will include: (1) vegetation removal including large riparian trees; (2) earth work to provide working surfaces for personnel and equipment; (3) possible drilling of pilot holes for piles by drill rig; (4) pile driving by large crane; (5) construction of forms and false work; (6) placement of rebar; and (7) pouring of concrete with concrete truck and pumper truck. From a distance of 10 to 45 m. from either side of the structures work may include storage of materials (rebar, piles, etc.), fabrication of rebar framework for columns, and movement of personnel and heavy equipment. Caltrans estimates the total area of impacted riparian vegetation to be 0.84 acres of removed riparian vegetation and 0.2 acres of disturbed riparian vegetation. The contractor would add clean, washed gravel into the river at either end of the bridge after construction is completed.

Best management practices (BMPs) including, but not limited to, silt fences, sediment basins, and limiting work to dry season, would be implemented during bridge construction to minimize the potential impacts. Where riparian vegetation would be removed during temporary construction activities, replacement plantings with native riparian species would also be implemented to restore functional habitat and provide bank stabilization. Caltrans has prepared a conceptual Storm Water Pollution Prevention Plan (SWPPP) which gives a listing of proposed BMPs for bridge construction (see Appendix A). Bridge construction is scheduled for 2004 and the exact bridge design has not been finalized. Caltrans will provide construction details and specifications to NMFS during final design of the structure when available, however, for the purposes of this consultation Caltrans has prepared a description of the probable bridge design.

In addition to limiting work to the bridge structures, Caltrans would be preserving land along the Bear River and tributaries through fee title and conservation easement. This conservation area is to provide habitat for the state-listed Swainson's hawk (under the California Endangered Species Act) and would be managed by the California Department of Fish and Game. This conservation measure would benefit several sensitive species, including listed Central Valley spring-run chinook salmon and Central Valley steelhead, and their designated critical habitat along the lower Bear River and Dry Creek. This parcel joins an existing CDFG conservation area along the Bear River. This measure also moves towards meeting targets provided in the Ecosystem Restoration Program Plan (CALFED Bay-Delta Program 1999). The conservation area, shown in Figure 3, includes the preservation of several linear segments of drainages, including 3.7 km (2.3 mi) of the lower Bear River and adjacent designated critical habitat, which encompasses 15 percent of the total accessible miles on the lower Bear River.

Roadway construction at Coon Creek and Ping Slough includes culvert extensions where existing culverts are located on existing Route 70. Similar to the Bear River, the culvert extensions within these drainage facilities would be confined to the summer low flow period. However, because of the altered conditions of these two drainage facilities as the result of channelization, water diversions, and flood control features, they currently do not provide suitable habitat for salmonids in the project area (Li 1994). Lower Coon Creek no longer receives its natural stream flows as most of the flow is intercepted and diverted into East Side Canal upstream of the Route 70 where it drains into Cross Canal, which flows into the Sacramento River near Verona. These canals are used by anadromous fish to access upper Coon Creek and Auburn Ravine drainages, which are designated critical habitat for the Central Valley steelhead (65 FR 7764, February 16, 2000). Stream flow of Coon Creek downstream and west of the East Side Canal diversion and within the project area is reduced to local runoff, leakage from the canal, and agricultural irrigation (mostly rice fields) creating slow moving, stagnant conditions with instream, emergent marsh vegetation.

Ping Slough is a tributary to lower Coon Creek also below the Coon Creek diversion point at East Side Canal. Upper Ping Slough includes two private impoundments east of Route 70 and is delineated as an intermittent stream within the project area creating reduced stream flows and would likely have high water temperatures (Li 1994). These conditions do not provide suitable habitat for spring-run chinook and steelhead (Li 1994), except perhaps during winter flood events.

Critical Habitat

Critical habitat within the proposed project area includes the lower Bear River and adjacent riparian zones for the Central Valley ESU's of spring-run chinook and steelhead (65 FR 7764, February 16, 2000). The Bear River and adjacent riparian zone provides functional habitat (e.g., shade, streambank stabilization, large woody debris input) for salmonid species. Where vegetation occurs along the river in the project area, Valley oak, Fremont's cottonwood, Oregon ash, and willow species, with an understory of Himalayan blackberry, dominate the riparian vegetation zone. The hatched area in Figure 2 identifies the maximum extent of temporary access for constructing the bridge crossing in the critical habitat area. This area encompasses 1.0 acre and includes 90 meter (295 ft) stream reach of the Bear River. Construction activities would not impede the flow of the river at any time, would occur during low flow periods (i.e., June to October), and would not require access along the entire length (e.g., any in-stream work would be limited to areas nearest the piers). As discussed above, Caltrans will provide construction details and specifications to NMFS during final design of the structure when available, including a detailed riparian restoration plan.

Action Area

The action area is the Bear River from Camp Far West Dam downstream to its confluence with the Feather River; lower Coon Creek; and several small creeks which will be crossed including Algodon and Ping Sloughs, and their riparian habitats. This proposed project includes a bridge crossing the Bear River and culvert extensions at the Coon Creek and Ping Slough crossings.

STATUS OF THE SPECIES AND CRITICAL HABITAT

This biological opinion analyzes the effects of the Route 70 Upgrade project on the following threatened evolutionary significant units (ESUs) and their critical habitats:

- Central Valley steelhead ESU (*Oncorhynchus mykiss*)- Threatened (63 FR 13347) and critical habitat (65 FR 7764).
- Central Valley spring-run chinook salmon ESU (*Oncorhynchus tshawytscha*)- Threatened (64 FR 50394) and critical habitat (65 FR 7764).

The listing status, critical habitat description, and biological information for the Central Valley steelhead ESU are described in greater detail Busby et al. (1996). More complete information on Central Valley spring-run chinook salmon may be found in Myers et al. (1998). There are no documented accounts of spring-run chinook salmon in the Bear River, however, very little information exists on Bear River fisheries. It is possible that during high flow events spring-run chinook salmon may enter the Bear River watershed.

Both of these species have suffered significant declines within their entire range. The current overall abundance of chinook salmon in the Central Valley is less than 75 percent of its level four decades ago, from 320,000 spawners in the 1950-1960's to 240,000 in the 1990's counting hatchery production (Yoshiyama et al. 2000). In the early 1960s, the California Fish and Wildlife Plan estimated a total run size of about 40,000 adults for the entire Central Valley including San Francisco Bay (CDFG 1965). The annual run size for this ESU in 1991-92 was probably less than 10,000 fish based on dam counts, hatchery returns, and past spawning surveys (McEwan and Jackson 1996).

Central Valley Steelhead - Threatened: Population Trends, Life History, and Biological Requirements

Effective May 18, 1999, NMFS listed the Central Valley steelhead Evolutionarily Significant Unit (ESU)[1] as threatened under the Endangered Species Act (63 FR 13347). Central Valley steelhead once ranged throughout most of the tributaries and headwaters of the Sacramento and San Joaquin River Basins prior to dam construction, water development, and watershed perturbations of the 19th and 20th centuries (McEwan and Jackson 1996). In the early 1960s, the California Fish and Wildlife Plan estimated a total run size of about 40,000 adults for the entire Central Valley including San Francisco Bay (CDFG 1965). The annual run size for this ESU in 1991-92 was probably less than 10,000 fish based on dam counts, hatchery returns, and past spawning surveys (McEwan and Jackson 1996).

Historically, steelhead occurred naturally throughout the Sacramento and San Joaquin River Basins, however, stocks have been extirpated from large areas of the Sacramento River and possibly form nearly all of the San Joaquin River Basin (Busby *et al.*1996). Steelhead habitat in the Central Valley is reported to have been reduced from 6000 miles historically to 300 miles at present (CACSS 1988). Reynolds *et al.* (1993) reported that 95 percent of salmonid habitat in California's Central Valley has been lost, largely due to mining and water development activities. Overall, habitat problems in this ESU relate primarily to water development resulting in inadequate flows, flow fluctuations, blockages, and entrainment into diversions (McEwan and Jackson 1996).

As with Central Valley spring-run chinook, impassable dams block access to most of the historical headwater spawning and rearing habitat of Central Valley steelhead. In addition, much of the remaining, accessible spawning and rearing habitat is severely degraded by elevated water temperatures, agricultural and municipal water diversions, unscreened and poorly screen water intakes, restricted and regulated streamflows, levee and bank stabilization, and poor quality and quantity of riparian and SRA cover.

At present, wild steelhead stocks appear to be mostly confined to upper Sacramento River tributaries such as Antelope, Deer, and Mill creeks and the Yuba River (McEwan and Jackson 1996). Naturally spawning populations are also known to occur in Butte Creek, and the upper Sacramento, Feather, American, Mokelumne, and Stanislaus rivers (CALFED 1999). However, the presence of naturally

[1] To qualify as an ESU under NMFS policy, a salmon population or group of populations must satisfy the following two criteria: (1) it must be substantially reproductively isolated from other conspecific population units, and (2) it must contribute substantially to ecological/genetic diversity of the biological species as a whole (Waples 1991).

spawning populations appears to correlate well with the presence of fisheries monitoring programs, and recent implementation of new monitoring efforts has found steelhead in streams previously thought not to contain a population, such as Auburn Ravine, Dry Creek, and the Stanislaus River. It is possible that other naturally spawning populations exist in Central Valley streams, but are undetected due to lack of monitoring or research programs (IEP Steelhead Project Work Team 1999).

All Central Valley steelhead are currently considered winter-run steelhead (McEwan and Jackson 1996), although there are indications that summer steelhead were present in the Sacramento River system prior to the commencement of large-scale dam construction in the 1940's (IEP Steelhead Project Work Team 1999). Adult steelhead migrate upstream in the Sacramento River mainstem from July through March, with peaks in September and February (Bailey 1954). The timing of upstream migration is generally correlated with higher flow events, such as freshets or sand bar breaches, and associated lower water temperatures. The preferred temperatures for upstream migration for are between 46 degrees Fahrenheit (° F) and 52° F (Reiser and Bjornn 1979, Bovee 1978, Bell 1986), however salmonids adapted to the Sacramento and San Joaquin Rivers may have increased temperature tolerance due to natural conditions of the Central Valley. Elevated stream temperatures during upstream migration periods can alter or delay migration timing, accelerate or retard mutations, and increase fish susceptibility to diseases. The minimum water depth necessary for successful upstream passage is 18 cm (Thompson 1972). Velocities of 3-4 meters per second approach the upper swimming ability of steelhead and may retard upstream migration (Reiser and Bjornn 1979).

Spawning may begin as early as late December and can extend into April with peaks from January through March (Hallock et al. 1961). Steelhead are iteroparous and may return to the ocean and repeat the spawning cycle for two or three years; however, the percentage of repeat spawners is generally low (Busby et al. 1996). Steelhead spawn in cool, clear streams featuring suitable gravel size, depth, and current velocity. Intermittent streams may be used for spawning (Barnhart 1986; Everest 1973). Gravels of 1.3 cm to 11.7 cm in diameter (Reiser and Bjornn 1979) and flows of approximately 40-90 cm/second (Smith 1973) are generally preferred by steelhead. Reiser and Bjornn (1979) reported that steelhead prefer a water depth of 24 cm or more for spawning. The survival of embryos is reduced when fines of less than 6.4 mm comprise 20 - 25 percent of the substrate. Studies have shown a survival of embryos improves when intragravel velocities exceed 20 cm/hour (Phillips and Campbell 1961, Coble 1961). The preferred temperatures for spawning are between 39° F and 52° F (McEwan and Jackson 1996).

Length of time required for eggs to develop and hatch is dependant on water temperature and is quite variable; hatching varies from about 19 days at an average temperature of 60° F to about 80 days at an average of 42° F. The optimum temperature range for steelhead egg incubation is 46° F to 52° F (Reiser and Bjornn 1979, Leidy and Li 1987). Egg mortality may begin at temperatures above 56° F (McEwan and Jackson 1996).

After hatching, pre-emergent fry remain in the gravel living on yolk-sac reserves for another four to six weeks, but factors such as redd depth, gravel size, siltation, and temperature can speed or retard this time (Shapovalov and Taft 1954). Upon emergence, steelhead fry typically inhabit shallow water along perennial stream banks. Older fry establish territories which they defend. Streamside vegetation is essential for foraging, cover, and general habitat diversity. Steelhead juveniles are usually associated with the bottom of the stream. In winter, they become inactive and hide in available cover, including gravel or woody debris.

The majority of steelhead in their first year of life occupy riffles, although some larger fish inhabit pools or deeper runs. Juvenile steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Water temperatures influence the growth rate, population density, swimming ability, ability to capture and metabolize food, and ability to withstand disease of these rearing juveniles. Rearing steelhead juveniles prefer water temperatures of 45° F to 60° F (Reiser and Bjornn 1979, Bovee 1978). Temperatures above 60° F have been determined to induce varying degrees of chronic stress and associated physiological responses in juvenile steelhead (Leidy and Li 1987).

After spending one to three years in freshwater, juvenile steelhead migrate downstream to the ocean. Most Central Valley steelhead migrate to the ocean after spending two years in freshwater (Hallock 1989). Barnhart (1986) reported that steelhead smolts in California range in size from 14 to 21 cm (fork length). Hallock et al. (1961) found that juvenile steelhead in the Sacramento Basin migrated downstream during most months of the year, but the peak period of emigration occurred in the spring, with a much smaller peak in the fall. Steelhead spend between one and four years in the ocean (usually one to two years in the Central Valley) before returning to their natal streams to spawn (Barnhart 1986, Busby et al. 1996).

Central Valley Steelhead Critical Habitat

On February 5, 1999, NMFS designated critical habitat for the Central Valley steelhead (64 FR 5740). The final rule designating steelhead critical habitat was issued on February 16, 2000 (65 FR 7764). Critical habitat consists of the water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches. Accessible reaches are those within the historical range of the ESU that can still be occupied by any life stage of steelhead. Inaccessible reaches are those above longstanding, naturally impassable barriers (e.g., natural waterfalls in existence for at least several hundred years) and specific dams within the historical range of each ESU. Critical habitat encompasses physical areas and their essential features including adequate: (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions.

Critical habitat for Central Valley steelhead is designated to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries in California. Also included are river reaches and estuarine areas of the Sacramento–San Joaquin Delta; all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay west of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco–Oakland Bay Bridge) from San Pablo Bay to the Golden

Gate Bridge. Excluded are areas of the San Joaquin River upstream of the Merced River confluence and areas above specific dams (Black Butte Dam, Centerville Dam, Oroville Dam, Camp Far West Dam, Monticello Dam, Nimbus Dam, Keswick Dam, Whiskeytown Dam, Englebright Dam, Crocker Diversion Dam, La Grange Dam, Comanche Dam, Goodwin Dam, and New Hogan Dam) or above longstanding, naturally impassable barriers.

Central Valley Spring-run Chinook Salmon - Threatened: Population Trends, Life History, and Biological Requirements

Effective November 16, 1999, the NMFS listed the Central Valley spring-run chinook salmon ESU as threatened under the Endangered Species Act (64 FR 50394). Historically, spring-run chinook salmon were predominant throughout the Central Valley, occupying the upper and middle reaches of the San Joaquin, American, Yuba, Feather, Sacramento, McCloud, and Pit Rivers, with smaller populations in most other tributaries with sufficient habitat for over-summering adults (Clark 1929). The Central Valley drainage as a whole is estimated to have supported spring-run chinook salmon runs as large as 600,000 fish between the late 1880s and 1940s (DFG 1998). Following the completion of Friant Dam, the native population from the San Joaquin River and its tributaries was extirpated, also, spring-run no longer exist in the American River due to Folsom Dam.

Clark (1929) estimated that originally there were 6,000 miles of salmon habitat in the Central Valley system and that 80% of this habitat had been lost by 1928. Yoshiyama et al. (1996) calculated that roughly 2,000 miles of salmon habitat was actually available before dam construction and mining, and concluded that 82% is not accessible today. Clark (1929) did not give details about his calculation. Whether Clark's or Yoshiyama's calculation is used, only remnants of their former range remain accessible today in the Central Valley (DFG 1998).

Impassable dams block access to most of the historical headwater spawning and rearing habitat of Central Valley spring-run chinook salmon. In addition, much of the remaining, accessible spawning and rearing habitat is severely degraded by elevated water temperatures, agricultural and municipal water diversions, unscreened and poorly screen water intakes, restricted and regulated streamflows, levee and bank stabilization, and poor quality and quantity of riparian and shaded riverine aquatic (SRA) cover.

The most recent data show natural spawning populations of Central Valley spring-run chinook salmon to be currently restricted to accessible reaches in the upper Sacramento River, Antelope Creek, Battle Creek, Beegum Creek, Big Chico Creek, Butte Creek, Clear Creek, Deer Creek, Feather River, Mill Creek, and Yuba River (DFG 1998; FWS, unpublished data). With the exception of Butte Creek and the Feather River, these populations are relatively small ranging from a few fish to several hundred. Butte Creek returns in 1998 and 1999 numbered approximately 20,000 and 3,600, respectively (DFG unpublished data). On the Feather River, significant numbers of spring-run chinook, as identified by run timing, return to the Feather River Hatchery. However, coded-wire-tag information from these hatchery returns indicates substantial introgression has occurred between fall-run and spring-run chinook populations in the Feather River due to hatchery practices. Over time, the spring-run within the Feather River may become homogeneous with Feather River fall-run fish unless current hatchery practices are changed.

Spring-run chinook salmon adults are estimated to leave the ocean and enter the Sacramento River from March to July (Myers et al. 1998). This run timing is well adapted for gaining access to the upper reaches of river systems, 1,500 to 5,200 feet in elevation, prior to the onset of high water temperatures and low flows that would inhibit access to these areas during the fall. Throughout this upstream migration phase, adults require streamflows sufficient to provide olfactory and other orientation cues used to locate their natal streams. Adequate streamflows are also necessary to allow adult passage to upstream holding habitat in natal tributary streams. The preferred temperature range for spring-run chinook salmon completing their upstream migration is 38°F to 56° F (Bell 1991; DFG 1998).

When they enter freshwater, spring-run chinook salmon are immature and they must hold over for several months before spawning. Their gonads mature during their summer holding period in freshwater. Over-summering adults require cold-water refuges, mainly deep pools, to conserve energy for gamete production, redd construction, spawning, and redd guarding. The upper limit of the optimal temperature range for adults holding while eggs are maturing is 59° F to 60° F (Hinze 1959). Unusual stream temperatures during spawning migration and adult holding periods can alter or delay migration timing, accelerate or retard mutations, and increase fish susceptibility to diseases. Sustained water temperatures above 80.6° F are lethal to adults (Cramer and Hammack 1952; DFG 1998).

Adults prefer to hold in deep pools with moderate water velocities and bedrock substrate and avoid cobble, gravel, sand, and especially silt substrate in pools (Sato and Moyle 1989). Optimal water velocities for adult chinook salmon holding pools range between 0.5-1.3 feet-per-second and depths are at least three to ten feet (G. Sato unpublished data, Marcotte 1984). The pools typically have a large bubble curtain at the head, underwater rocky ledges, and shade cover throughout the day (Ekman 1987).

Spawning typically occurs between late-August and early October with a peak in September. Once spawning is completed, adult spring-run chinook salmon die. Spawning typically occurs in gravel beds that are located at the tails of holding pools (USFWS 1995a). Spring-run adults have been observed spawning in water depths of 0.8 feet or more, and water velocities from 1.2-3.5 feet-per-second (Puckett and Hinton 1974). Eggs are deposited within the gravel where incubation, hatching, and subsequent emergence takes place. Optimum substrate for embryos is a mixture of gravel and cobble with a mean diameter of one to four inches with less than 5% fines, which are less than or equal to 0.3 inches in diameter (Platts et al. 1979, Reiser and Bjornn 1979). The upper preferred water temperature for spawning adult chinook salmon is 55° F (Chambers 1956) to 57° F (Reiser and Bjornn 1979).

Length of time required for eggs to develop and hatch is dependant on water temperature and is quite variable, however, hatching generally occurs within 40 to 60 days of fertilization (Vogel and Marine 1991). In Deer and Mill creeks, embryos hatch following a 3-5 month incubation period (USFWS 1995). The optimum temperature range for chinook salmon egg incubation is 44° F to 54° F (Rich 1997). Incubating eggs show reduced egg viability and increased mortality at temperatures greater than 58° F and show 100% mortality for temperatures greater than 63° F (Velsen 1987). Velsen (1987) and Beacham and Murray (1990) found that developing chinook salmon embryos exposed to water temperatures of 35° F or less before the eyed stage experienced 100% mortality (DFG 1998).

After hatching, pre-emergent fry remain in the gravel living on yolk-sac reserves for another two to four weeks until emergence. Timing of emergence within different drainages is strongly influenced by water temperature. Emergence of spring-run chinook typically occurs from November through January in Butte and Big Chico Creeks and from January through March in Mill and Deer Creeks (DFG 1998).

Post-emergent fry seek out shallow, nearshore areas with slow current and good cover, and begin feeding on small terrestrial and aquatic insects and aquatic crustaceans. As they grow to 50 to 75 mm in length, the juvenile salmon move out into deeper, swifter water, but continue to use available cover to minimize the risk of predation and reduce energy expenditure. The optimum temperature range for rearing chinook salmon fry is 50° F to 55° F (Boles 1988, Rich 1997) and for fingerlings is 55° F to 60° F (Rich 1997).

In Deer and Mill creeks, juvenile spring-run chinook, during most years, spend 9-10 months in the streams, although some may spend as long as 18 months in freshwater. Most of these "yearling" spring-run chinook move downstream in the first high flows of the winter from November through January (USFWS 1995, DFG 1998). In Butte and Big Chico creeks, spring-run chinook juveniles typically exit their natal tributaries soon after emergence during December and January, while some remain throughout the summer and exit the following fall as yearlings. In the Sacramento River and other tributaries, juveniles may begin migrating downstream almost immediately following emergence from the gravel with emigration occurring from December through March (Moyle et al. 1989, Vogel and Marine 1991). Fry and parr may spend time rearing within riverine and/or estuarine habitats including natal tributaries, the Sacramento River, non-natal tributaries to the Sacramento River, and the Delta. In general, emigrating juveniles that are younger (smaller) reside longer in estuaries such as the Delta (Kjelson et al. 1982, Levy and Northcote 1982, Healey 1991). The brackish water areas in estuaries moderate the physiological stress that occurs during parr-smolt transitions. Although fry and fingerlings can enter the Delta as early as January and as late as June, their length of residency within the Delta is unknown but probably lessens as the season progresses into the late spring months (DFG 1998).

In preparation for their entry into a saline environment, juvenile salmon undergo physiological transformations known as smoltification that adapt them for their transition to salt water (Hoar 1976). These transformations include different swimming behavior and proficiency, lower swimming stamina, and increased buoyancy that also make the fish more likely to be passively transported by currents (Saunders 1965, Folmar and Dickhoff 1980, Smith 1982). In general, smoltification is timed to be completed as fish are near the fresh water to salt water transition. Too long a migration delay after the process begins is believed to cause the fish to miss the "biological window" of optimal physiological condition for the transition (Walters et al. 1978). The optimal thermal range for chinook during smoltification and seaward migration is 50° F to 55° F (Rich 1997).

Chinook salmon spend between one and four years in the ocean before returning to their natal streams to spawn (Myers et al. 1998). Fisher (1994) reported that 87% of returning spring-run adults are three-years-old based on observations of adult chinook trapped and examined at Red Bluff Diversion Dam between 1985 and 1991.

Central Valley Spring-run Chinook Critical Habitat

On February 16, 2000 NMFS designated critical habitat for the Central Valley spring-run chinook salmon ESU (65 FR 7764). Critical habitat consists of the water, substrate, and adjacent riparian zone of accessible estuarine and riverine reaches. Accessible reaches are those within the historical range of the Central Valley spring-run chinook ESU that can still be occupied by any life stage of chinook salmon. Inaccessible reaches are those above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and specific dams within the historical range of each ESU. Adjacent riparian zones are defined as those areas within a slope distance of 300 feet from the normal line of high water of a stream channel or adjacent off-channel habitats (600 feet when both sides of the channel are included).

Critical habitat for Central Valley spring-run chinook is designated to include all river reaches accessible to chinook salmon in the Sacramento River and its tributaries in California. Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Excluded are areas above specific dams or above longstanding naturally impassable barriers.

Central Valley Impacts

Profound alterations to the riverine habitat of the Central Valley began with the discovery of gold in the middle of the last century. Dam construction, water diversion, and hydraulic mining soon followed, launching the Central Valley into the era of water manipulation and coincident habitat degradation. A number of documents have addressed the history of human activities, present environmental conditions, and factors contributing to the decline of salmon and steelhead species in the Central Valley. For example, NMFS has prepared range-wide status reviews for west coast chinook (Myers et al. 1998) and steelhead (Busby et al. 1996). Information is also available in Federal Register notices announcing ESA listing proposals and determinations for Central Valley steelhead ESU (March 19, 1998; 63 FR 13347) and critical habitat (February 16, 2000; 65 FR 7764) and Central Valley spring-run chinook salmon (September 16, 1999; 64 FR 50394) and critical habitat (February 16, 2000; 65 FR 7764).

Human activities contributed to the decline in Central Valley anadromous salmonids and their habitats eventually leading to listing the species under the ESA. The activities include: (1) dam construction that blocks previously accessible habitat; (2) water development activities that affect the water quantity, timing, and quality; (3) land use activities such as agriculture, flood control, urban development, mining, and logging that degrade aquatic habitat; (4) hatchery operation and practices; and (5) harvest activities. These activities are ongoing and continue to affect the species.

Hydropower, flood control, and water supply dams of the Central Valley Project (CVP), State Water Project (SWP), and other municipal and private entities have permanently blocked or hindered salmonid access to historical spawning and rearing grounds. Clark (1929) estimated that originally there were 6,000 miles of salmon habitat in the Central Valley system and that 80 percent of this habitat had been lost by 1928. Yoshiyama et al. (1996) calculated that roughly 2,000 miles of salmon habitat was actually available before dam construction and mining, and concluded that 82 percent is not accessible today. Currently, only remnants of the salmon's former range remain accessible in the Central Valley.

Large dams on every major tributary to the Sacramento and San Joaquin rivers block salmon and steelhead access to the upper portions of the respective watersheds. On the Sacramento River, Keswick and Shasta dams block passage to historic spawning and rearing habitat in the upper Sacramento, McCloud and Pit rivers. On the Feather River Oroville Dam and associated facilities block passage to the upper Feather River watershed. Nimbus Dam blocks access to most of the American River Basin. Englebright and Daguerre Point dams block access to the upper Yuba River. These upper waters are preferred spawning and rearing habitat for spring-run chinook salmon and steelhead.

Depleted flows in dammed waterways have contributed to higher temperatures, lower dissolved oxygen levels, and decreased recruitment of gravel, large woody debris, and riparian vegetation (Spence et al. 1996). Historical seasonal flow patterns included high flood flows in the winter and spring with declining flows throughout the summer and early fall. With the completion of upstream reservoir storage projects throughout the Central Valley, the seasonal distribution of flows differs substantially from historical patterns. The magnitude and duration of peak flows during the winter and spring are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies (CALFED 2000). Water management now reduces natural variability by creating more uniform flows year-round that diminish natural channel forming, riparian vegetation, and food web functions.

Water diversions for irrigated agriculture, municipal and industrial use, and managed wetlands are found throughout the Central Valley. Hundreds of water diversions exist along the Sacramento River and its tributaries. Depending on the size, location, and season of operation, unscreened intakes may entrain many life stages of aquatic species, including juvenile salmonids.

About 150 years ago, the Sacramento River was bordered by up to 500,000 acres of riparian forest, with bands of vegetation literally spreading four to five miles (The Resources Agency 1989). By 1979, riparian habitat along the Sacramento River diminished to 11,000-12,000 acres or about 2 percent of historic levels (McGill 1979). More recently, about 16,000 acres of remaining riparian vegetation has been reported (McGill 1987). The degradation and fragmentation of riparian habitat has resulted mainly from flood control and bank protection projects, together with the conversion of riparian land to agriculture (Jones and Stokes Associates 1993).

Increased sedimentation resulting from agricultural and urban practices within the Central Valley is another example of salmonid habitat degradation. Sedimentation can adversely affect salmonids during all freshwater life stages by clogging, or abrading gill surfaces; adhering to eggs; inducing behavioral modifications including avoiding an area or not feeding; burying eggs or alevins; scouring and filling pools and riffles; reducing primary productivity and photosynthetic activity; and decreasing intergravel permeability and dissolved oxygen levels. Embedded substrates can reduce the production of juvenile salmonids and hinder the ability of some over-wintering juveniles to hide in the gravels during high flow events.

Land use activities associated with road construction, urban development, logging, mining, agriculture, and recreation have significantly altered fish habitat quantity and quality through alteration of streambank and channel morphology; alteration of ambient stream water temperatures; degradation of water quality; elimination of spawning and rearing habitat; fragmentation of available habitats; elimination of downstream recruitment of gravel and large woody debris; and removal of riparian vegetation; and increased streambank erosion. Agricultural practices have eliminated large trees and logs and other woody debris that would have been otherwise recruited to the stream channel. Large woody debris influences stream morphology by affecting pool formation, channel pattern and position, and channel geometry. Organic input to the water course also provides nutrients necessary for primary productivity and as a food source for aquatic insects, who in turn are consumed by salmonids.

ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species within the action area. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area (50 CFR §402.02).

Factors Affecting Species in Action Area

Impacts to the action area are similar to impacts to the entire Central Valley region including water diversions which may entrain or impinge fish; flow reduction; channelization; increased water temperatures resulting from riparian vegetation removal and flow reduction; urbanization including increase in impervious surfaces, decrease in water quality due to pollutants and nutrients, and degradation of habitat quality; and agriculture which diverts flow and adds excessive nutrients and pesticides to water courses. Much of Sutter, Yuba, and Butte counties is devoted to agricultural production with agricultural lands covering nearly one million acres within the three counties combined. Irrigated agriculture impacts salmonids and their habitat by causing a decrease in surface waters through diversions, degradation of water quality from fertilizer and pesticide runoff which may lead to algae blooms and cause dissolved oxygen levels to decrease, and disturbance or removal of riparian habitat.

The Bear River is the second largest tributary to the Feather River with a watershed area of 300 square miles. Historical, natural flow conditions in the Bear River were high winter flows and low flow in the summer months (CALFED 2000). Currently, Bear River flows are almost entirely regulated by several storage reservoirs and diversions. Camp Far West is the largest storage reservoir and the South Sutter Irrigation District Diversion Dam (SSID) is the largest diversion. Minimum flow releases below the SSID diversion into the Bear River are 25 cubic feet per second (cfs) in the spring and 10 cfs the rest of the year. Flows from June through December are generally 0 to 40 cfs except in the wettest years. Currently, flows in years of highest rainfall are similar to unimpaired flows from fall to spring, averaging 3500 to 5200 cfs in winter; summer flows are 30 to 50 cfs, compared to unimpaired flows of 70 to 150 cfs (CALFED 2000).

The current upstream limit of anadromous fish is the SSID diversion dam approximately 15 miles above the confluence with the Feather (CALFED 2000). The Bear River currently provides habitat for salmonids which is of limited quality mainly due to inadequate instream flow requirements from the SSID diversion dam and flood control activities. Due to inadequate flows, no self-sustaining population of salmon currently exists in the Bear River, however, when heavy fall rains occur and sufficient spillage occurs at SSID, hundreds of salmon and steelhead migrate up and spawn in the lower Bear River (CALFED 2000). In addition, numerous small water diversions and hydroelectric projects are currently in operation within the Bear River watershed.

Counties most readily served by the State Route 70 include Sutter, Yuba, and Butte counties. They have all experienced growth in population and increases in housing. Sutter County experienced a 150 percent increase in population from 1970 to 1999 . Yuba County has grown by 30 percent between 1970 and 1999. From 1992 to 1997 Sutter County increased its agricultural land by 9 percent while Butte and Yuba counties lost agricultural lands by 11 percent each.

Coon Creek, Ping Slough, and Algodon Slough

Route 70 crosses these three drainages and currently uses culverts at the stream crossings. This project proposes to extend the existing culverts at these crossings. Anadromous fish returning to Coon Creek travel from the Sacramento River up the Cross Canal then up the East Side Canal and from there access Auburn Ravine, Coon Creek, and several other smaller drainages. The action area for this project in lower Coon Creek is downstream from the East Side Canal which, due to lack of flow, has become overgrown with wetland vegetation, flow is intermittent, and does not appear to currently support salmonids. This is likely due to these inhospitable habitat conditions that will remain unchanged under the previously described managed flow release regime.

EFFECTS OF THE ACTION

Construction of the Bear River crossing will likely result in some disturbance to the channel and banks of the Bear River. Due to low flow conditions in the river, sediment may remain in the river rather than be flushed out as would normally occur with high winter flows. The removal of riparian vegetation for bridge construction may cause a temporary decrease in shaded riparian aquatic (SRA) habitat and large woody debris. These impacts should be minimized by implementation of BMPs, adherence to the SWPPP, future shading from the bridge, and by replacement of riparian vegetation through restoration. While revegetation may take a few years before sufficient canopy cover replacement will become effective, the preserved area will retain its already high SRA values in the lower Bear River.

Direct effects of bridge construction, expansion, and culvert installation include disturbance and redistribution of fine sediment in the river channel and increased turbidity resulting from in-channel construction. Addition of sediment to the river may decrease primary productivity and reduce the abundance and diversity of aquatic invertebrates which are the food source for salmonids. Sediment deposition may adversely affect spawning and incubation habitat by filling interstitial spaces and decreasing oxygen levels in redds, and sedimentation may also decrease the carrying capacity for young fish that use interstitial crevices as shelter. Suspended sediment may decrease visibility and adversely affect salmonid food capture. Also, high levels of particulate matter in the water column may cause physical harm to salmonids by abrading gill structure and impacting respiration. Proposed construction BMPs, including coffer dam installation, dewatering, and use of timing windows will minimize the potential for construction related turbidity or discharge of sediments into this area.

Adverse impacts to CV steelhead resulting from in-channel bridge construction will be minimized through adherence to an in-channel construction window from June 1 - October 15, implementation of construction BMPs, and adherence to the SWPPP. During late spring through early fall, prior to the first rain, water temperatures at the bridge site will likely exceed salmonid thresholds, dissolved oxygen levels will be correspondingly low, and flows will likely be extremely low. Summer low flow conditions in the Bear River in a normal water year cause stagnant water conditions and temperatures from 18° -25° C are not uncommon. Insufficient flow conditions and/or lack of holding pools would preclude adult salmon presence. Juvenile fish have been shown to experience high rates of mortality at temperatures from 17° - 23° C (Kjelson 1988). Temperatures above 25°C appear to be the lethal limit for salmonids in the Sacramento River (Boles 1988). If juvenile salmonids are present during construction, mortality is possible. For example, coffer dam installation and dewatering may kill or injure juvenile steelhead through capture, stranding, and dessication. However, NMFS considers this possibility unlikely due to prevailing low flow conditions and high water temperatures during the proposed work windows and expects that few, if any, salmonids will be present during construction. As a result, construction activities are not expected to result in an appreciable reduction in the numbers, reproduction, or distribution of the affected salmonid populations, and therefore are not likely to preclude species survival and recovery, or result in adverse modification of critical habitat.

Construction work will require use of heavy equipment, placement of access roads and staging areas, and equipment storage. All these activities may result in ground disturbance, riparian vegetation disturbance and removal, and soil compaction leading to higher runoff. Ground disturbance may cause an increase in sediment. Riparian vegetation removal or disturbance may result in a minor and temporary effects including a decrease in SRA habitat, elevated water temperature, and habitat heterogeneity through a decrease in large woody debris availability. This could result in a decrease in habitat suitability and availability in the vicinity of the bridge construction. however, habitat value is relatively low within this short stretch of the river. Shading currently provided by riparian trees that are to be removed will be replaced to a large extent by shading provided by the new bridge structure. Addition of upstream areas within the conservation area would protect riparian habitat upstream of the project in perpetuity. The riparian corridor upstream and downstream of the project site has a high percentage of canopy cover and instream large woody debris which provides suitable habitat to salmonids if they are in the vicinity. With little or no salmonid activity in this reach, due to predominantly low flow conditions, these temporary effects are not likely to affect salmonid populations in this area. Because the area appears to have had low salmonid activity in a historical sense, and low flow regimes have been in place for years, the value of this area is not likely to change and because it does not and has not supported significant numbers of salmonids, it is not considered critical to overall recovery of salmonids. Revegetation activities and preservation of the upstream conservation area will avoid adverse modification of critical habitat, and may increase habitat values in this area over time .

Release of toxic substances, such as oil, fuel, grease or other substances in or near a water course during construction activities could degrade water quality and harm or kill aquatic species including young salmonids and their macroinvertebrate prey base. Construction-related impacts may be avoided through use of BMPs such as those outlined in the attached SWPPP.

Pile driving during bridge construction can cause behavioral responses in fish, such as avoidance (Feist et al. 1992) and in some cases, internal injuries. Placement of pilings in the active channel of a river may also result in hydraulic changes which could cause scouring, erosion, or other channel disturbance. Pier placement in the active channel may also result in a minor loss of shallow water habitat. These impacts may cause minor channel alterations and cause a slight reduction in the amount of available habitat for rearing juvenile salmonids. Because regulated, chronic low flow conditions in the Bear River have limited the amount of available habitat in this area, bridge impacts would likely be an undetectable incremental reduction in habitat quantity. Because of long-term low flow conditions and related water temperature problems have rendered this reach unsuitable for temperature-sensitive fish, it is unlikely salmonids would be found in this reach. However, temporary bridge impacts are reduced through adherence to BMPs, the SWPPP, and a strict timing window to avoid any impacts to salmonid species that might stray into the area. These bridge impacts are therefore not likely to significantly affect salmonids or their critical habitat. Further, the lack of documented salmonid presence and related low flow/poor habitat conditions in this reach suggests the area is not and has not been an important spawning or rearing area for many years. Thus, any salmonids occasionally present here do not represent a significant contribution to the reproductive success, survival or recovery of these species. The proposed protective measures to be implemented during project construction are sufficient to protect the few, if any, fish present in the project area.

The indirect and interrelated effects of the Route 70 Upgrade project which are reasonably certain to occur include increased development and urbanization within the geographic area served by this portion of Route 70. Sutter and Yuba counties are most readily served by State Route 70. These counties have experienced recent growth in population and increases in housing. Sutter County is expected to increase in population by 34,368 between 2000 and 2020. Yuba County is expected to increase its population by 20,627 between 2000 and 2020. In Yuba County, five housing developments plan to house 78,028 residents, which exceeds the expected growth. However, in Yuba County, a major portion of the land west of SR 70, from the southern county border to below Olivehurst, was already proposed for development, prior to construction of any highway improvement projects (Caltrans 1999). Other potential development includes the Lake Plumas Specific Plan and the Arboga Study Area. As part of the Plumas Lake Specific plan, a new four-lane south arterial road is scheduled to be completed in 2003 (SACOG 2001). Another planned future highway project, the Marysville to Oroville proposed freeway, traverses the same area. Made accessible by this new section of freeway, the area northeast of Marysville is reserved as a specific plan. The counties maintain that all urban developments are unrelated to any highway improvements, that some have already been developed, and others planned for the future will go forward with or without highway improvements (Larry Combs, pers. comm. 2001). Specific details regarding these developments or other phases of highway improvement projects were not available for NMFS review.

There are also several other proposed freeway projects being planned, including the Marysville Bypass, Route 70 Extension (Oroville), and the Butte Route 149 Freeway Upgrade project, the third bridge crossing the Feather River, the Motorplex Parkway Interchange, and the Route 99 Highway Upgrade. These proposed projects will be federally-funded projects, and as such they will be analyzed under future Section 7 consultations.

Increased development, especially the transformation of open space to residential or commercial developments has the potential to affect salmonids and their critical habitat. Urbanization has obvious effects on soils and natural vegetation that, in turn, affect hydrologic and erosional processes, as well as physical characteristics of aquatic habitats. A decrease in riparian vegetation may alter the amount of shading provided to the stream elevating stream temperatures and reducing inputs of woody debris, organic detritus, and invertebrate prey. Replacement of native vegetation with lawns or ornamental plants often requires large quantities of water and fertilizers for growth. Runoff from this vegetation can cause nutrient loading in a stream which may, in turn, cause excessive algal growth which leads to a decrease in dissolved oxygen levels. Reduced levels of dissolved oxygen can adversely affect the swimming performance of migrating salmonids (Bjornn and Reiser 1991); may lead to a reduced prey base; can affect the growth of fry; and ultimately may lead to fish kills (Spence et al.1996).

Urbanization significantly influences hydrologic processes, increasing the magnitude and frequency of peak discharges and reducing summer base flows (Spence et al. 1996). These changes occur primarily because an increase in impervious surface and the replacement of complex, natural drainage channels with culverts and drainage ditches. In developed areas infiltration is reduced as soils are stripped of natural vegetation, paved over, or compacted. Increases in storm runoff caused by decreased infiltration may result in more frequent flood events (Klein 1979).

An increase in impermeable surfaces will occur with the highway upgrade and the growth within Sutter and Yuba counties. Conversion from open space or agricultural lands to developed areas causes a decrease in the rate of infiltration and an increase in the amount and timing of stormwater runoff. An increase in stormwater runoff would contribute to degradation of water quality, in the action area and continuing downstream, if it is allowed to discharge directly into a water course. Stormwater runoff from paved surfaces, such as roads and bridges, typically contains toxic materials including hydrocarbons, heavy metals, pesticides, herbicides, and nutrients. Most of the stormwater runoff occurs during the winter rainy season which is also when spawning occurs and egg development begins. Fish embryo and larval development are especially sensitive to the adverse effects of pollution and effects may range from egg mortality and failure to hatch to changes in larval morphology (Skinner et al. 1999). Other habitat impacts from stormwater inputs include channel erosion, habitat degradation, and sediment toxicity (Novotny and Witte 1997).

The preservation of riparian habitat, through conservation easements along the Bear River, as part of this project, would ensure the riparian habitat will be maintained in perpetuity. This section of the river currently contains high quality SRA habitat with sufficient canopy cover which provides good quality critical habitat. Inclusion of the conservation area would offset some of the short-term, unavoidable impacts arising from construction of the new bridge including loss of SRA habitat. The conservation easement along the Bear River would also provide a buffer from any future development which may occur in the vicinity and help maintain the biotic integrity of the riparian and aquatic habitat. In addition, adherence to the SWPPP will provide a means to control water quality issues related to the runoff associated with highway improvements and adjacent urban development, as described above.

Coon Creek, Ping Slough, and Algodon Slough

Route 70 crosses these three drainages and currently uses culverts at the stream crossings. This project proposes to extend the existing culverts at these crossings. Anadromous fish returning to Coon Creek travel from the Sacramento River up the Cross Canal then up the East Side Canal and from there access Auburn Ravine, Coon Creek, and several other smaller drainages. Lower Coon Creek, where the culvert proposed to be extended is located, is downstream from the East Side Canal. Due to lack of flow this section of Coon Creek has become overgrown with wetland vegetation. Although it may carry flow in the rainy season it is unlikely that salmonids would use this lower portion of the creek as it does not provide suitable habitat conditions nor does it provide upstream access. Ping Slough and Algodon Slough are intermittent and are not likely to provide habitat for salmonids. Extending the box culverts would not adversely affect salmonids, their migration, or their critical habitat. Potential construction impacts from culvert extension would be minimized through BMPs as outlined in the SWPPP, and use of construction windows as outlined in this opinion.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The highway upgrade project will directly improve freeway access to portions of Sutter and Yuba counties, and will also facilitate access to areas due north and south. Development in the two counties has increased substantially in the past ten years and is expected to continue as ongoing and future build-out projects are implemented including the East Linda, Plumas Lake, and North Marysville specific plans; general plans for Sutter and Yuba counties; and general plans for the City of Marysville and the Yuba City Urban Area. For example, Yuba County has planned development from five projects which will house an additional 78,028 people residing in 28,322 new residential units (Caltrans 2000). Other development includes the North Arboga Study Area, and the Yuba County Motorplex and Amphitheater.

Potential impacts to salmonids arising from build out of the aforementioned specific and general plans may include: (1) degradation of water quality by stormwater runoff, residential runoff, and input of sediment from roads and developments; (2) direct mortality or decrease in vigor of juvenile salmonids resulting from pollutants; (3) direct mortality of eggs due to sedimentation in spawning gravels or increase in water temperature; (4) constriction or removal of riparian corridor which results in increased summer water temperatures, decreased dissolved oxygen levels, and lack of woody debris recruitment; and (5) impacts to hydrology resulting in reduced summer base flows and an increase magnitude and frequency of peak discharge which leads to erosion and channel simplification. Other impacts may include human-related intrusion into critical habitat as housing developments are built near creeks and people visit the creeks, build trails, fish the creeks, allow their pets access, and fertilize their lawns, for example. Many of these potential impacts may be minimized through public education, worker and neighborhood awareness programs, and coordinated regional planning efforts.

Development may be designed and implemented in such a manner that salmonids and their critical habitat are not adversely affected. NMFS has not yet been provided specific information regarding any future development projects. Those actions requiring a federal permit will result in consultations with NMFS. We will also have the opportunity to review environmental documents to ensure the development process includes avoidance and minimization measures to protect all watercourses, and that actions do not preclude the survival and recovery of listed salmonid species. Measures may include preservation of riparian habitat through open space designation, not allowing direct discharge of untreated stormwater runoff to enter any water courses, and other design standards which will maintain the integrity of the watercourses, their floodplains, and their ecological processes. Stormwater treatment solutions may be accomplished through development design as has been shown in recent development in Portland, Oregon where they designed parking lots with grassy swales as medians which filter out pollutants before it reaches the stormwater conveyance system (NRDC 2000). Studies have examined the use of constructed wetlands as urban runoff water quality control

(Schueler 2000, Horner 2000, Strecker 2000).

CONCLUSION

The Bear River has historically had flows highly dependent on rainfall patterns and often went dry during the summer. Currently the flows are almost entirely regulated by reservoir releases and diversions (CALFED 2000) and 15 miles of habitat is all that is accessible. Due to chronically low flows, salmonids are most likely staying in the Feather River rather than attempting to migrate up the Bear River, however, during extreme wet years salmonids do ascend the Bear River. During these wet years juveniles may ascend the Bear River as well and take advantage of many miles of suitable habitat, including the conservation area upstream of the project area. Implementation of the Route 70 expansion would not cause an adverse affect to salmonids' sporadic use of the Bear River. Final design of the bridge must be approved by NMFS and will include specifications to accommodate any potential future flow increases while avoiding adverse modificiation of critical habitat.

After reviewing the best available scientific and commercial information, including the current status of Central Valley steelhead and spring-run chinook salmon, the environmental baseline for the action area, the effects of the proposed Route 70 Highway Upgrade project, and the cumulative effects, it is NMFS' biological opinion that the proposed highway upgrade project, as proposed, is not likely to jeopardize the continued existence of the Central Valley steelhead or spring-run chinook salmon ESU and is not likely to destroy or adversely modify designated critical habitat.

NMFS anticipates that some construction activities associated with the proposed project may result in incidental take of Central Valley steelhead and spring-run chinook. Specifically, take may occur during installation and dewatering of coffer dams and during pile driving. While such take is expected to be rare, an incidental take statement is included with this Biological Opinion for these actions.

INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and section 7(o)(2), take that is incidental to and not intended as part of the agency action is not considered to be prohibited take under the ESA provided that such take is in compliance with the terms and conditions of this Incidental Take Statement.

Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with Section 7(a)(2) of the ESA, and the proposed action may incidentally take individuals of a listed species, NMFS will issue a statement that specifies the impact of any incidental take of endangered or threatened species. It also requires that reasonable and prudent measures, and terms and conditions to implement the measures, be provided that are necessary to minimize such impacts.

The measures described below are nondiscretionary, and must be undertaken by FHWA so that they become binding conditions of any funding associated with the Route 70 Freeway Upgrade project, as appropriate, for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered under this incidental take statement. If the FHWA: (1) fails to assume and implement the terms and conditions, or (2) fails to require Caltrans to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or funding document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA or Caltrans must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take

The FHWA's funding and Caltrans implementation of this freeway upgrade project is expected to result in minimal incidental take of Central Valley steelhead or spring-run chinook salmon. It is unlikely that steelhead and chinook salmon will be present during the in-channel construction window due to environmental conditions. However, if fish are present, they will be disturbed by construction activities and may be trapped and removed from coffer dams. In the unlikely event that steelhead or chinook salmon are found to be present, they may be captured and relocated downstream, and subjected to related stresses. Lethal take of relocated fish is not expected to exceed five (5) fish. Non-lethal take may include disturbance, displacement, or injury, and fish may also be killed by construction activities. The level of incidental take of un-relocated fish will be difficult to detect because very little information is available on juvenile salmonid presence in the Bear River, but is not expected to exceed five (5) fish.

However, a total of approximately 0.84 acres of riparian vegetation would be removed and 0.2 acres would be disturbed. The linear length of the construction footprint is estimated to be approximately 295 feet on each side of the river. Any juvenile salmonids within this area, and areas of downstream effects, are expected to be harmed as a result of removal or modification of this habitat and are included in the incidental take limit of five (5) relocated fish, and five (5) un-relocated fish.

The level of take anticipated in this Incidental Take Statement is limited to the impacts of the proposed construction of the Route 70 Upgrade project. NMFS expects that there may be take resulting from the associated future development within the action area. Incidental take associated with future residential, commercial, or industrial development facilitated by the infrastructure improvements in the Route 70 Upgrade is not covered by this Incidental Take Statement. Project proponents for those associated actions are responsible to ensure that their actions either do not result in take, or seek authorization through an ESA Section 10(a)(1)(b) incidental take permit or Steelhead

4(d) Rule Take Limit Program.

Effect of the Take

In this Biological opinion NMFS has determined that the level of anticipated take is not likely to result in jeopardy to the Central Valley steelhead ESU or the Central Valley spring-run chinook salmon ESU or to destroy or adversely modify designated critical habitat.

Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to avoid or minimize take of Central Valley steelhead and spring-run chinook salmon:

1. Measures shall be taken to minimize injury to steelhead and chinook during construction of the bridge, replacement of the culverts, and continued use of the highway.

2. Measures shall be taken to avoid or minimize impact to critical habitat during construction of the bridge, replacement of the culverts, and continued use of the highway.

Terms and Conditions

FHWA and Caltrans are responsible for compliance with the following non-discretionary terms and conditions that implement the reasonable and prudent measures described above.

1. Measures shall be taken to minimize injury to steelhead and chinook salmon during construction of the bridge, replacement and extension of the culverts, and continued use of the highway.

A. Pile driving, coffer dam installation and dewatering, and other in-channel construction activities shall occur only between June 1 and October 15.

B. Any salvage of salmonids from within the coffer dams must be coordinated with a biologist from the NMFS, Sacramento area office (916)-930-3600, before it is undertaken, and must be done by a qualified fishery biologist using approved methodology. If fish are found in the coffer dam, prior to dewatering the fishery biologist shall use one or more of the following NMFS approved methods to capture the fish: dip net, seine, throw net, minnow trap, or hand. The biologist shall note the number of individuals and the date and time of collection and relocation and submit this information the the NMFS, Sacramento area office.

C. Any incidental take of chinook or steelhead must be immediately reported to NMFS by telephone (916)-930-3600 or fax (916)-930-3629.

2. Measures shall be taken to avoid or minimize impact to critical habitat during construction of the bridge, replacement/extension of the culverts, and continued use of the highway.

A. FHWA shall ensure that best management practices (BMPs) shall be employed during construction to ensure the river banks and channel are not disturbed to the maximum extent possible including, but not limited to, the BMPs described in the conceptual SWPPP (Appendix A).

B. The final bridge design shall be provided for NMFS' review and approval and shall include: specifications regarding areas where riparian vegetation will be removed and replanted, placement of construction materials, identification and treatment of staging areas, type and source of construction materials to be placed in the channel, and types and timing of activities to occur directly in the channel and on the banks, and details of the clean-up process and removal of materials of the site. NMFS must approve of final design and specifications before construction commences.

C. Removal of riparian vegetation shall be avoided as much as possible and, when not possible, replaced at a 3:1 ratio on-site or within close proximity on the Bear River. When the riparian restoration plan is completed a copy shall be sent to NMFS at:

Supervisor, Protected Resources Division
National Marine Fisheries Service
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814

D. Bridge and adjacent highway design shall not allow stormwater from any road or bridge surface to be directly discharged to any drainage during construction and in perpetuity.

E. No fill material, including concrete, beyond that identified in the project description, shall be allowed to enter any waters of the U.S.

F. Channel disturbance should be kept to a minimum, no material should be left in the channel, and if bridge footings are to be protected by rock, the channel bottom elevation must not be elevated above the natural channel bottom.

G. During coffer dam use, water pumped out of the dam which may be turbid should not be allowed to enter the channel unless sediment has settled out, resulting in no increase in turbidity in any waters of the U.S.

H. Water that contacts wet concrete and has a pH greater than 9 must be pumped out of the coffer dam and disposed of outside the channel and away from the riparian zone or any wetland area.

I. Where bridge abutments are constructed, materials used must be non-toxic to aquatic life.

J. During construction, all equipment refueling and maintenance will occur outside the channel and riparian area, except for the drill rig or other stationary equipment. To minimize the potential for fluid leaks during operation, refueling, or maintenance, spill control absorbent material will be placed under all stationary equipment.

K. Any spill of hazardous material must be reported to NMFS immediately by telephone at (916)-930-3600 or by fax at (916)-930-3629.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat, to help implement recovery plans, or to develop information.

1. FHWA and Caltrans should participate in development of a regional growth management plan to ensure impacts of the associated growth in Sutter and Yuba Counties do not contribute to degradation of steelhead or chinook salmon habitat; including water quality, flow conditions and releases, riparian habitat, and other factors.

2. FHWA or Caltrans should explore other opportunities within the Bear River or Coon Creek drainage to restore, create, or preserve SRA habitat.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the proposed Route 70 Upgrade project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

LITERATURE CITED

Bailey, E. D. 1954. Time pattern of 1953-54 migration of salmon and steelhead into the upper Sacramento River. Calif. Dept. Fish and Game unpublished report. 4 pp.

Barnhart, R.A. 1986. Species Profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest), steelhead. U.S. Fish Wildl. Serv. Biol. Rep. 82(11.60), 21 p.

Beacham, T.D. and C.B. Murray. 1990. Temperature, egg size, and development of embryos and alevins of five species of Pacific salmon: a comparative analysis. Transactions of the American Fisheries Society 119: 927-45.

Bell, M.C. 1986. Fisheries handbook of engineering requirements and biological criteria. U.S. Army Corps of Engineers, Office of Chief Engineers, Fish Passage Development and Evaluation Program, Portland, OR.

Bell, M.C. 1991. Fisheries handbook of Engineering Requirements and Biological Criteria (3rd edition). U.S. Army Corps of Engineers, Portland, OR.

Boles, G.L. 1988. Water temperature effects on chinook salmon (*Oncorhynchus tshawytscha*) with emphasis on the Sacramento River. A Literature Review. Department of Water Resources, Northern District. January, 1988. Pg. 42.

Bovee, K.D. 1978. Probability-of-use criteria for the family Salmonidae. FWS/OBS-78-07. U.S. Department of the Interior, Fish and Wildlife Service. Washington D.C.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California. U.S. Dept. Of Commerce NOAA Technical Memorandum NMFS-NWFSC-27.

CALFED Bay-Delta Program. 1999. Ecosystem Restoration Program Plan Volume 2: Ecological Management Zone Visions. Revised Draft, February 1999. Sacramento, CA.

CALFED Bay-Delta Program. 2000. Ecosystem Restoration Program Plan Volume 2: Ecological Management Zone Visions. Final, July 2000. Sacramento, CA.

California Advisory Committee on Salmon and Steelhead (CACSS). 1988. Restoring the balance. Calif. Dept. of Fish & Game. Sacramento, CA. 84 pp.

California Department of Fish & Game (CDFG). 1965. California Fish and Wildlife Plan. Three volumes. Sacramento, CA.

_____.1998. A status review of the spring-run chinook salmon in the Sacramento River Drainage. Report to the Fish & Game Commission. Candidate species status report 98-1. June 1998. Sacramento, CA.

California Department of Transportation (Caltrans). 1999. Draft Environmental Impact Report/Statement. Caltrans and FHWA, Sacramento, CA.

_____. 2000. State Route 70 Sacramento to Chico Corridor Growth Inducement Report. Caltrans, District 3, Office of Regional Planning.

Chambers, J. 1956. Fish passage development and evaluation program. Pregress Report No. 5. U.S. Army Corps of Engineers, North Pacific Division, Portland, OR.

Clark, G.H. 1929. Sacramento-San Joaquin salmon (*Oncorhynchus tshawytscha*) fishery of California. Calif. Fish Game Bull. 17:73

Coble, D.W. 1961. Influence of water exchange and dissolved oxygen in redds on survival of steelhead trout embryos. Trans. Am. Fish. Soc. 90(4):469-474.

Cramer, F.K. and D.F. Hammack. 1952. Salmon research at Deer Creek, California. U.S. Fish & Wildlife Service, Spec. Sci. Report 67. 16 pp.

Ekman, E.G. 1987. Adult spring-run salmon surveys, 1986 and 1987. Office memo, November 17, 1987. Lassen National Forest.

Everest, F.H. 1973. Ecology and management of summer steelhead in the Rogue River. Oregon State Game Commission. Fishery Research Report 7. 48p.

Feist, B.E. J.J. Anderson, and R. Miyamoto.1992. Potential Impacts of pile driving on juvenile pink (*Oncorhynchus gorbuscha*) and chum (*O. keta*) salmon behavior and distribution. Fisheries Research Institute, University of Washington, Seattle, WA. 58 pp.

Fisher, F.W. 1994. Past and present status of Central Valley chinook salmon. Conservation Biology 8:870-873.

Folmar, L.C. and W.W. Dickhoff. 1980. The parr-smolt transformation (smoltification) and seawater adaptation in salmonids: a review of selected literature. Aquaculture 21: 1-37.

Hallock, R.J., W.F. Van Woert and L. Shapavalov. 1961. An evaluation of stocking hatchery-reared steelhead rainbow trout (Salmo gairdneri gairdneri) in the Sacramento River system.

Calif. Fish Game Fish Bull. 114, 73 p.

Hallock, R.J. 1989. Upper Sacramento River steelhead, *Oncorhynchus mykiss*, 1952-1988. A report prepared for the U.S. Fish and Wildlife Service, Red bluff, CA. Calif. Dept. Fish and Game, Sacramento.

Healey, M.C. 1991. The life history of chinook salmon (*Oncorhynchus tshawytscha).* In C. Groot and L. Margolis, Eds. , Life History of Pacific salmon, p. 311-393. Univ. B.C. Press, Vancouver, B.C.

Hinze, J.A. 1959. Annual Report, Nimbus salmon and steelhead hatchery, Fiscal year of 1957-1958. California Department of Fish & Game. Inland Fisheries Administrative Report 59-4.

Hoar, W.S. 1976. Smolt transformation: evolution, behavior, and physiology. J. Fish. Res. Bd. Can. 33: 1233-1252.

Interagency Ecological Program (IEP). 1999. Steelhead Project Work Team. Sacramento, CA.

Jones and Stokes Associates, Inc. 1993. Strategies, potential sites, and site evaluation criteria for restoration of Sacramento River fish and wildlife habitats, Red Bluff to the Feather River. Prepared for the U. S. Army Corps of Engineers, Sacramento, California. 30 pp.

Kjelson, M.A., P.F. Raquel, and F. W. Fisher. 1982. Life history of fall-run juvenile chinook salmon, *Oncorhynchus tshawytscha,* in the Sacramento-San Joaquin estuary, California, p. 393-411. In: V.S. Kennedy (ed.). Estuarine comparisons. Academic Press, New York, NY.

Klein, R.D. 1979. Urbanization and stream quality impairment. Water Resources Bulletin 15:948-963.

Leidy, G. R., and S. Li. 1987. Analysis of river flows necessary to provide water temperature requirements of anadromous fishery resources of the lower American River. Lower American River Curt reference, EDF V. EBMUD, Exhibit No. 69-A. Prepared by McDonough, Holland, and Allen, Sacramento, CA.

Levy, D.A. and T.G. Northcote. 1982. Juvenile salmon residency in a marsh area of the Fraser River estuary. Can. J. Fish. Aq. Sci. 39: 270-276.

Li, Stacy K. 1994. Potential Route 70 Upgrade Affects on Fish Resources. Aquatic Systems Research prepared for Woodward-Clyde Consultants. Caltrans District 3, Marysville.

Marcotte, B.D. 1984. Life history, status, and and habitat requirements of spring-run chinook salmon in California. Unpubl. USFS Report, Lassen National Forest, Chester, CA. 34 p.

McEwan, D., and T. Jackson. 1996. Steelhead Restoration and Management Plan for California.

Calif. Dep. of Fish and Game, February 1996. 234pp.

McGill, R.R. 1979. Land use changes in the Sacramento River riparian zone, Redding to Colusa. Department of Water Resources, Northern District. 23 p.

McGill, R.R. Jr. 1987. Land use changes in the Sacramento River riparian zone, Redding to Colusa. A third update: 1982-1987. Department of Water Resources, Northern District. 19p.

Moyle, P.B., J.E. Williams, and E.D. Wikramanayake. 1989. Fish Species of Special Concern of California. Final report submitted to State of Calif. Resources Agency, October 1989.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T. C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Of Commerce, NOAA Tech Memo. NMFS-NWFSC-35, 443p.

National Marine Fisheries Service (NMFS). Guidelines for Salmonid Passage at Stream Crossings. NMFS Southwest Region. Final Draft May 16, 2000.

NRDC. 2000. Natural Resources Defense Council. Information from their website (www.nrdc.org/water/pollution/storm/chap10.asp) from a report on Stormwater Strategies.

Novotny, V. and J.W. Witte. 1997. Ascertaining aquatic ecological risks of urban stormwater discharges. Wat. Res. 31(10):2573-2585.

Phillips, R.W. and H.J. Campbell. 1961. The embryonic survival of coho salmon and steelhead trout as influenced by some environmental conditions in gravel beds. Annual Rep. Pac. Mar. Fish. Comm. 14:60-73.

Platts, W.S., W.F. Magahan, and G.W. Minshall. 1979. Methods for evaluating stream, riparian, and biotic conditions. USDA Gen. Tech. Report INT-138. Ogden, UT. 78 pp.

Puckett, L.K. and R.N. Hinton. 1974. Some measurements of the relationship between streamflow and king salmon spawning in the main Eel and South Fork Eel rivers. Cal. Dept. of Fish & Game, Env. Svcs. Br. Admin. Report No. 74-1.

Reiser, D. W., and T. C. Bjornn. 1979. Habitat requirements of anadromous salmonids. USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR, General Technical Report PNW-96, 54 pp.

Resources Agency, State of California. 1989. Upper Sacramento River Fisheries and Riparian Management Plan. Prepared by an Advisory Council established by SB 1 086, authored by

State Senator Jim Nielson. 157 p.

Reynolds, F.L., T.J. Mills, R. Benthin, and A. Low. 1993. Restoring Central Valley streams: A plan for action. California Department of Fish & Game, Sacramento, CA, 184 p.

Rich, A.A. 1987. Water temperatures which optimize growth and survival of the anadromous fishery resources of the lower American River. A.A. Rich and Associates, San Rafael, CA. 24 pp.

SACOG. Sacramento Area Council of Governments. Information taken from their website in 2001.

Sato, G. M. and P.B. Moyle. 1989. Ecology and conservation of spring-run chinook salmon. Annual report, Water Resources Center Project W-179, July 30, 1988- June 30, 1989.

Saunders, R.L. 1965. Adjustment of buoyancy in young Atlantic salmon and brook trout by changes in swim bladder volume. J. Fish. Res. Bd. Can. 22: 335-352.

Shapovalov, L. and A.C. Taft. 1954. The life histories of the steelhead rainbow trout (Salmo gairdneri gairdneri) and silver salmon (Oncorhynchus kisutch) with special reference to Waddell Creek, California, and recommendations regarding their management. Calif. Dep. Fish Game, Fish Bull. 98, 375 p.

Skinner, L., A. de Peyster, and K. Schiff. 1999. Developmental effects of urban storm water in medaka (Oryzias latipes) and inland silverside (Menidia beryllina). Arch. Envir. Contam. Toxicol. 37: 227-235.

Smith, A.K. 1973. Development and application of spawning velocity and depth criteria for Oregon salmonids. Trans. Am. Fish. Soc. 10(2):312-316.

Smith, L.S. 1982. Decreased swimming performance as a necessary component of the smolt migration in salmon in the Columbia River. Aquaculture 28: 153-161.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR.

Thompson, K. 1972. Determining stream flows for fish life. In Proceedings, Instream Flow Requirement Workshop. Pacific Northwest River Basin Commission, Vancouver, WA. Pp. 31-50.

U.S.F.W.S. 1995. Sacramento-San Joaquin Delta Native Fishes Recovery Plan. U.S. Fish & wildlife Service, Portland, OR.

Velson, F.P.J. 1987. Temperature and incubation in Pacific salmon and rainbow trout: compilitation of data on median hatching time, mortality, and embryonic staging. Canadian Data Report of Fisheries and Aquatic Sciences.

Vogel, D.A. and K.R. Marine. 1991. Guide to upper Sacramento River chinook salmon life history. Report to the U.S. Bureau of Reclamation, Central Valley Project. CH2M Hill, Redding, CA.

Walters, C.J., R. Hilborn, R.M. Peterman, and M.J. Stanley. 1978. Model for examining early ocean limitation of Pacific salmon production. J. Fish. Res. Bd. Can. 35: 1303-1315.

Waples, R.S. 1991. Pacific salmon, Oncorhynchus spp., and the definition of "species" under the Endangered Species Act. National Marine Fisheries Service, Mar. Fish. Rev. 53(3):11-22.

Yoshiyama, R.M., E.R. Gerstung, F.W. Fisher, and P.B. Moyle. 1996. Historical and present distribution of chinook salmon in the Central Valley drainage of California. Sierra Nevada ecosystem Project: final report to congress. Ages 309-362 in Volume 3. Assessments, commissioned reports, and background information. University of California, Center for Water and Wildland Resources, Davis.

TABLE 1

1990 Corridor Study - Recommended State Highway Improvements

✔$	SR 70: From SR 99 to existing freeway south of Marysville	(MIS Projects 1,2,3)
	SR 99: From SR 149 to existing freeway south of Chico	
✔	SR 20/99 Interchange	(MIS Project 10)
	SR 99: From Bogue Road to SR 20 – four-lane expressway	
✔$	SR 149/99 Interchange	(MIS Project 7)
✔$	SR 149/70 Interchange	(MIS Project 5)
✔$	SR 149: From SR 70 to SR 99 – four-lane freeway	(MIS Project 6)
	SR 99: From Yuba City to Live Oak – four-lane expressway	
✔$	***SR 70: From SR 20 to existing freeway south of Oroville***	(MIS Project 9)
✔$	SR 65: From SR 70 to SR 99 – Third River Crossing (2 lanes)	(MIS Project 4)
✔$	***SR 70: Marysville Bypass***	(MIS Project 8)
	SR 99: From Bogue Road to SR 20 – six-lane expressway	

✔ - MIS pipeline projects - Programmed in State Transportation Improvement Plan

$ - Included in 1998 STIP (Capital Outlay Support and/or Construction costs)

(Projects incorporated into this project are shown in italics.)

From the: Marysville to Oroville Freeway, Statement of Purpose and Need, November 5, 1999.

Appendix A

Conceptual Storm Water Pollution Prevention Plan
Yuba/Sutter 70 Bear River Bridge

Introduction

This project proposes to reduce traffic delays and congestion, improve safety, and to initially provide expressway and ultimately freeway access to the Marysville / Yuba City area by upgrading the existing 2 lane highway on State Route (SR) 70 south of Marysville to a four lane expressway from the 99/70 Wye to 0.3 mile south of the McGowan Parkway overcrossing . Right of way will be acquired to accommodate construction of an ultimate four-lane freeway. Three alternatives and a no build are proposed.

Project Background

The portion of SR 70 from Striplin Road to Nicolaus Avenue was constructed as a conventional two-lane highway in 1952. The section from Cornelius Avenue to the north was constructed in 1961 and 1962 as a two-lane expressway designed for an ultimate four-lane facility. Right of way from Nicolaus Avenue to the north was acquired for the ultimate four-lane freeway design and included an East Nicolaus bypass to the west (see Exhibit-B, 1958 Freeway Agreement Map).

The local, regional and state transportation plans recognize the importance of providing increased accessibility to the cities and towns within the 70/99 corridor -- accessibility that a modern freeway can provide. Both State Route (SR) 99 and the southern segments of SR 70 are lifelines for agricultural commerce through the northern Central Valley of California. At this time, Chico, Oroville, and Marysville/Yuba City are three of the few urbanized areas in California without freeway access.

Project Need and Purpose

State Route 99 south, and SR 70 north of the project, are four-lane expressways/freeways. This portion of SR 70 is a two-lane highway with increasingly heavy commuter, recreational, commercial and agricultural use.

Sacramento, Sutter, and Yuba Counties have experienced rapid growth. The increased traffic has produced congestion on SR 70. A four-way stop in the town of East Nicolaus and several at-grade intersections add to the congestion problem. Growth forecasts for the corridor indicate that traffic congestion and delays will continue to increase if SR 70 is not improved. This two-lane section forms a constriction between the four-lane sections both north and south of the project limits. The Yuba-Sutter area is one of the few urbanized areas in California without freeway access.

The current Level of Service (LOS) is D. If SR 70 is not improved, the LOS for the year 2010 will be E and deteriorate to F by the year 2020.

This project was initiated to reduce traffic delays and congestion, improve safety, and to initially provide expressway and ultimately freeway access to the Marysville / Yuba City area. It provides right of way for future growth and will result in better travel speeds, less energy consumption, better air quality, a reduction in accidents, and fewer vehicle hours of travel.

The proposed improvements will maintain a LOS of B for the year 2010 and LOS C for the year 2020. The improvements will provide the first phase of providing freeway access to Oroville and Chico.

Stormwater Introduction

Caltrans has a comprehensive and coordinated statewide effort to prevent pollution in storm water runoff from Caltrans facilities. The Caltrans Stormwater program is regulated under the Statewide National Pollutant Discharge Elimination System (NPDES) permit no. 99-06-DWQ. Caltrans is required to meet the requirements of section 301 and 401 of the Clean Water Act, which requires pollutants be controlled to the Maximum Extent Practicable (MEP). Caltrans must also use the Best Available Technology Economically Achievable/Best Conventional Technology for construction projects.

The highway 70 widening project includes the construction of a new bridge east of the highway 70 bridge and the widening of the highway 70 bridge.. This segment of the project poses the greatest potential for pollution to a sensitive water body. The Bear River is the receiving water of concern for this project and is known to have populations of Central Valley spring-run chinook salmon and Central Valley steelhead, both of which are on the Federally Threatened species list, as well as candidate species, Central Valley fall-run chinook salmon. The greatest risk to these species occurs during construction where large amounts of sediment could potentially be released into the river. Sediments released into a river can cover essential spawning beds or smother the developing eggs. Decreased oxygen levels is a consequence of sediment releases to the river. This oxygen depleting sediment releases can negatively effect aquatic species, especially trout and salmon if not minimized.

Streambed alluvium may contain other trace pollutants, such as heavy metals. The Central Valley Regional Water Quality Control Board recently determined the Bear River has elevated levels of Mercury. Although these levels are low, they can bio-accumulate in aquatic species. This construction project will not add mercury to the stream directly. However, if sufficient alluvium is disturbed there is potential to aggravate the buried Mercury above the ambient levels. These levels are short lived due to the settling out and burying of the disturbed sediment due to the deposition of natural upstream sediment loading. To prevent any short-term increases in heavy metals during construction, Best Management Practices (BMP) must be used to mitigate sediment releases to the river. This is especially true when construction activity is located in the active streambed.

To mitigate the effects of construction on the aquatic species of the Bear River, Caltrans will require the contractor to submit a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP is a pollution prevention program required for all construction projects over 5 acres. Federal Law, specifically the Clean Water Act requires a SWPPP in areas where there is a potential to negatively effect water quality. Because of the sensitive species present in the Bear River flood plain channel, Caltrans will give the contractor a list of the minimum required BMPs as part of the construction informational handout separate from the bid documents. The contractor may use these BMPs or choose other approved BMPs that provide equal or greater protection of water quality. The Contractor will include these BMPs into their SWPPP which must be approved by the Caltrans Resident Engineer and the Central Valley Regional Water Quality Control Board prior to the start of construction.

Storm Water Manuals

Caltrans has assembled a number of manuals to provide direction to contractors and Caltrans staff on the implementation and design of storm water controls during the planning, design, and construction of highways. These manuals are subject to change with the pending adoption of the new Caltrans Storm Water Management Plan on May 17, 2001. Prior to preparation of the SWPPP the contractor shall reference the most recent manual editions.

The manuals and documents include the following:

1. Caltrans Statewide NPDES permit
2. Caltrans Statewide Storm Water Management Plan
3. Caltrans Statewide Storm Water Quality Practice Guidelines
4. Caltrans Project Planning and Design Guide
5. Caltrans Construction Site Best Management Practices (BMP) manual
6. Caltrans Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual

These materials provide Caltrans and their contractors the guidance and direction to implement highway projects that meet federal law and provide protection of water quality.

General Construction BMP

The construction of the Bear River Bridge has been identified as the most sensitive segment of the project in regards to impacting water quality. The BMPs used to protect the water quality of the river include the following.

1. Avoid soil disturbances where possible:
    a. Caltrans will widen the existing bridge and construct a new bridge. Widening the existing bridge will reduce the amount of disturbed soil, because fewer number of new footings are required.
    b. Caltrans Structures is investigating alternative designs to avoid construction activity in the active streambed.
    c. Caltrans is designing the project to avoid as much vegetation as possible.

2. Where vegetation disturbances are necessary, appropriate BMPs will be used to mitigate their impacts:

   a. Vegetation areas will be restored with plantings
   b. Native Riparian vegetation will be revegetated
   c. Disturbed soils will be graded and stabilized
   d. Areas prone to erosion will be protected with rock

3. Construction Scheduling:

   a. Construction will occur when the water levels are low and outside of the fall when salmon and steelhead are within the river system and sensitive to construction activities.
   b. During the October 15 through April 15 rainy season, Caltrans will provide extra BMPs to control runoff and avoid floodplains and water conveyance systems where possible.

BMPs Needed For SWPPP

Caltrans Construction Site Best Management Practices Manual has working details for Temporary BMPs that will be used during construction. Index notation subject to change with manual revisions; please reference the most current manual edition at time of SWPPP preparation and implementation. The following BMPs will be used during the construction project:

1. SS-1 Scheduling
2. SS-2 Preservation of Existing Vegetation
3. SS-3 Hydraulic Mulch
4. SS-4 Hydroseeding
5. SS-5 Soil Binders
6. SS-6 Straw Mulch
7. SS-7 Geotextiles, Plastic Covers and Erosion Control Blankets/Mats
8. SS-9 Earth Dikes/Drainages Swales and Lined Ditches
9. SS-10 Outlet Protection/Velocity Dissipation Devices
10. SS-11 Slope Drains
11. SC-1 Silt Fence
12. SC-2 Desilting Basin
13. SC-3 Sediment Trap
14. SC-4 Check Dams
15. SC-5 Fiber Rolls
16. SC-6 Gravel Bag Berm
17. NS-1 Water Conservation Practices
18. NS-2 Dewatering Operations
19. NS-3 Paving and Grinding Operations
20. NS-6 Illicit Connection/Connection Discharge Detection and Reporting
21. NS-8 Vehicle and Equipment Cleaning
22. NS-9 Vehicle and Equipment Fueling
23. NS-10 Vehicle and Equipment Maintenance

24. WM-2 Material Use
25. WM-3 Stockpile Management
26. WM-4 Spill Prevention and Control
27. WM-5 Sold Waste Management
28. WM-8 Concrete Waste Management
Appendix A: Abbreviations, Acronyms, and Definitions of Terms

The conceptual storm water pollution prevention plan is a dynamic document that will evolve as the design nears completion. Certain phases of the project pose a greater threat to Water Quality and will require more specific details and drawings. For example, the type and location of the footings for the new bridge are still being investigated at this time and will require a conceptual plan for stormwater protection when the design is final. Another location of concern is Yankee Slough, which requires entering the floodplain in November to transplant Elderberry bushes. The specifications for this crossing are being developed in a manner that protects endangered aquatic species and provides access to protect the endangered Elderberry Beetle. The details of these Best Management Practices will be coordinated with the respective regulatory agencies as they develop and will be provided to the construction contractor for incorporation into the final SWPPP.

Enclosure 2

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

ESSENTIAL FISH HABITAT CONSERVATION RECOMMENDATIONS

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) set forth new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) in fishery management plans (FMPs) or FMP amendments for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH.

I. IDENTIFICATION OF ESSENTIAL FISH HABITAT

Essential fish habitat is defined in the MSFCMA as: "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity..." NMFS regulations further define "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" to cover a species' full life cycle..

The geographic extent of freshwater essential fish habitat (EFH) for the Pacific coast salmon fishery includes waters currently or historically accessible to salmon within specific U.S. Geological Survey hydrologic units (PFMC 1999). For the Bear River and lower Coon Creek, the aquatic areas that may be identified as EFH for Pacific salmon are within the hydrologic unit map numbered 18020108 and 18020109, respectively.

General life history information for chinook salmon is summarized below. Further detailed information on chinook salmon ESUs are available in the NMFS status review of chinook salmon from Washington, Idaho, Oregon, and California (Myers et al. 1998), and the NMFS proposed rule for listing several ESUs of chinook salmon (NMFS 1998).

Central Valley fall-run chinook enter the Sacramento and San Joaquin Rivers from July through April and spawn from October through December (FWS 1998) with spawning occurring from October through December although San Joaquin River populations tend to spawn later in the year than

Sacramento River populations (Myers et al. 1998). Peak spawning occurs in October and November (Reynolds et al. 1993). Chinook salmon spawning generally occurs in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 6 inches, usually 1-3 feet to 10-15 feet. Preferred spawning substrate is clean loose gravel and gravels are unsuitable when they have been cemented with clay or fines or when sediments settle out onto redds reducing intergravel percolation (NMFS 1997).

Egg incubation occurs from October through March, and juvenile rearing and smolt emigration occurs from January through June (Reynolds et. al. 1993). At the time of emergence from their gravel nests, most fry disperse downstream towards the estuary shortly after they emerge or as smolts (Kjelson et al. 1982), hiding in the gravel or stationing in calm, shallow waters with fine sediments substrate and bank cover such as tree roots, logs, and submerged or overhead vegetation. Juvenile rearing occurs from January through mid May and the smaller fry inhabit marginal areas of the river, particularly back eddies, behind fallen trees, undercut tree roots or over areas of bank cover (Lister and Genoe 1970). Juvenile emigration occurs from mid March through mid June. Chinook salmon fry prefer slower velocity streambank areas and orient upstream to the current as opposed to the smolt stage that swims downstream with the current (Schaffter 1980). As they grow, the juveniles associate with coarser substrates along the stream margin or farther from shore (Healey 1991). Along the emigration route, submerged and overhead cover in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade and protect juveniles from predation.

Principal foods of chinook salmon while rearing in freshwater and estuarine environments are larval and adult insects and zooplankton such as Daphnia, flies, gnats, mosquitoes or copepods (Kjelson et al. 1982), stonefly nymphs or beetle larvae (Chapman and Quistdorff 1938) as well as other estuarine and freshwater invertebrates.

II. DESCRIPTION OF PROPOSED ACTION

The proposed action is described in the preceding biological opinion (Enclosure 1).

III. EFFECTS OF THE ACTION

Potential impacts of the Route 70 Upgrade project project to Pacific coast salmon EFH would be similar to the effects of the action discussed in the preceding biological opinion concerning impacts to threatened Central Valley steelhead and spring-run chinook salmon. These impacts include (1) disturbance from in-channel construction activities; (2) degradation of water quality from increased suspended sediment or other pollutants; (3) permanent loss or degradation of EFH at the project site; and (4) degradation of habitat quality due to development in Sutter and Yuba counties.

IV. CONCLUSION

Upon review of the effects of the State Route 70 Upgrade project, NMFS believes that the project may adversely affect the EFH of Pacific salmon due to disturbance, degradation of water quality, loss or degradation of SRA habitat, and long-term degradation of habitat quality due to development in Sutter and Yuba counties, i.e. growth inducing elements.

V. EFH CONSERVATION RECOMMENDATIONS

NMFS recommends that the Reasonable and Prudent Measures and their respective Terms and Conditions listed in the Incidental Take Statement of the preceding Biological Opinion be adopted as EFH Conservation Recommendations. In addition, NMFS recommends that the two ESA Conservation Recommendations be adopted as EFH Conservation Recommendations.

VI. FHWA's STATUTORY REQUIREMENTS

The MSFCMA and Federal regulations (50 CFR Sections 600.920) to implement the EFH provisions of the MSFCMA require federal action agencies to provide a written response to EFH Conservation Recommendations within 30 days of their receipt. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide an explanation of the reasons for not implementing them.

VII. REFERENCES

Chapman, W.M. and E. Quistdorff. 1938. The food of certain fishes of north central Columbia River drainage, in particular, young chinook salmon and steelhead trout. Wash. Dept. Fish. Biol. Rep. 37-A:1-14.

EPA (U.S. Environmental Protection Agency). 2000. National management measures to control nonpoint source pollution from marinas and recreational boating. Draft document prepared by Tetra Tech, Incorporated (Fairfax, VA) for Edwin F. Drabkowski, Nonpoint Source Control Branch, Office of Water, U.S. Environmental Protection Agency. Washington, DC. June 2000.

FWS (U.S. Fish and Wildlife Service). 1995. Sacramento-San Joaquin Delta Native fishes Recovery Plan. FWS, Portland, OR.

FWS (U.S. Fish and Wildlife Service). 1998. Central Valley Project Improvement Act Tributary Production Enhancement Report. Draft report to Congress on the feasibility, cost, and desirability of implementing measures pursuant to subsections 3406(e)(3) and (e)(6) of the Central Valley Project Improvement Act. FWS, Central Valley Fish and Wildlife Restoration Program Office, Sacramento, CA.

Hatton, S. R. 1940. Progress report on the Central Valley fisheries investigations, 1939. California Fish and Game 26: 334-373.

Healey, M.C. 1991. Life history of chinook salmon. In C. Groot and L. Margolis: Pacific Salmon Life Histories. University of British Columbia Press. pp. 213-393.

Kano, R. M. 1996. Annual report: chinook salmon spawning stocks in California's Central Valley, 1984. California Department of Fish and Game, Inland Fisheries division, Admin. Report No. 96-3. 40pp.

Kano, R.M. 1998. Annual report: chinook salmon spawning stocks in California's Central Valley, 1981. California Department of Fish and Game, Inland Fisheries division, Admin. Report No. 98-8. 40pp.

Kjelson, M.A., P.F. Raquel, and F. W. Fisher. 1982. Life history of fall-run juvenile chinook salmon, Oncorhynchus tshawytscha, in the Sacramento-San Joaquin estuary, California, p. 393-411. In: V.S. Kennedy (ed.). Estuarine comparisons. Academic Press, New York, NY.

Kondolf, G. M., J. C. Vick and T. M. Ramirez. 1996a. Salmon spawning habitat on the Merced River, California: An evaluation of project planning and performance. Trans. Amer. Fish. Soc. 125:899-912.

Kondolf, G. M., J. C.. Vick and T. M. Ramirez. 1996b. Salmon spawning habitat rehabilitation in the Merced, Tuolumne, and Stanislaus Rivers, California: An evaluation of project planning and performance. University of California Water Resources Center Report No. 90, ISBN 1-887192-04-2, 147pp.

Lister, D. B. and H. S. Genoe. 1970. Stream habitat utilization by cohabiting underyearlings of (Oncorhynchus tshawytscha) and coho (O. kisutch) salmon in the Big Qualicum River, British Columbia. J. Fish. Res. Board Can. 27:1215-1224.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T. C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Of Commerce, NOAA Tech Memo. NMFS-NWFSC-35, 443p.

NMFS (National Marine Fisheries Service). 1997. Proposed recovery plan for the Sacramento River winter-run chinook salmon. NMFS, Southwest Region, Long Beach, California. 288 p. plus appendices.

NMFS (National Marine Fisheries Service). 1998. Endangered and threatened species: Proposed endangered status for two chinook salmon ESUs and proposed threatened status for five chinook salmon ESUs; proposed redefinition, threatened status, and revision of critical habitat for one chinook salmon ESU; proposed designation of chinook salmon critical habitat in California, Oregon, Washington, Idaho. Federal Register 63 (45): 11482-11520. March 9, 1998.

PFMC (Pacific Fishery Management Council). 1999. Description and identification of essential fish habitat, adverse impacts and recommended conservation measures for salmon. Amendment 14 to the Pacific Coast Salmon Plan, Appendix A. Portland, OR.

PFMC (Pacific Fishery Management Council). 2000. Review of 1999 ocean salmon fisheries. Portland, OR.

Reynolds, F. L., T. J. Mills, R. Benthin and A. Low. 1993. Restoring Central Valley streams: A plan for action. California Department of Fish and Game, Sacramento, CA. 129pp.

Rich, A. A. and W. E. Loudermilk. 1991. Preliminary evaluation of chinook salmon smolt quality in the San Joaquin Drainage. California Department of Fish and Game, Fresno CA. 76 pp.

Schaffter, R. G. Fish occurrence, size, and distribution in the Sacramento River near Hood, California during 1973 and 1974. Calif. Fish Game Anad. Fish Admin Rep. No. 80-3. 76pp.

Yoshiyama, R. M., E. R. Gerstung, F. W. Fisher and P. B. Moyle. 1996. Historical and present distribution of chinook salmon in the Central Valley drainage of California. Pp. 309-362. IN: Sierra Nevada Ecosystem Project: Final report to congress, vol. III, Assessments, Commissioned Reports, and Background Information. Davis: University of California, Centers for Water and Wildland Resources.

Yoshiyama, R. M., E. R. Gerstung, F. W. Fisher and P. B. Moyle. 2000. Chinook salmon in the California Central Valley: an assessment. Fisheries 25(2):6-20.

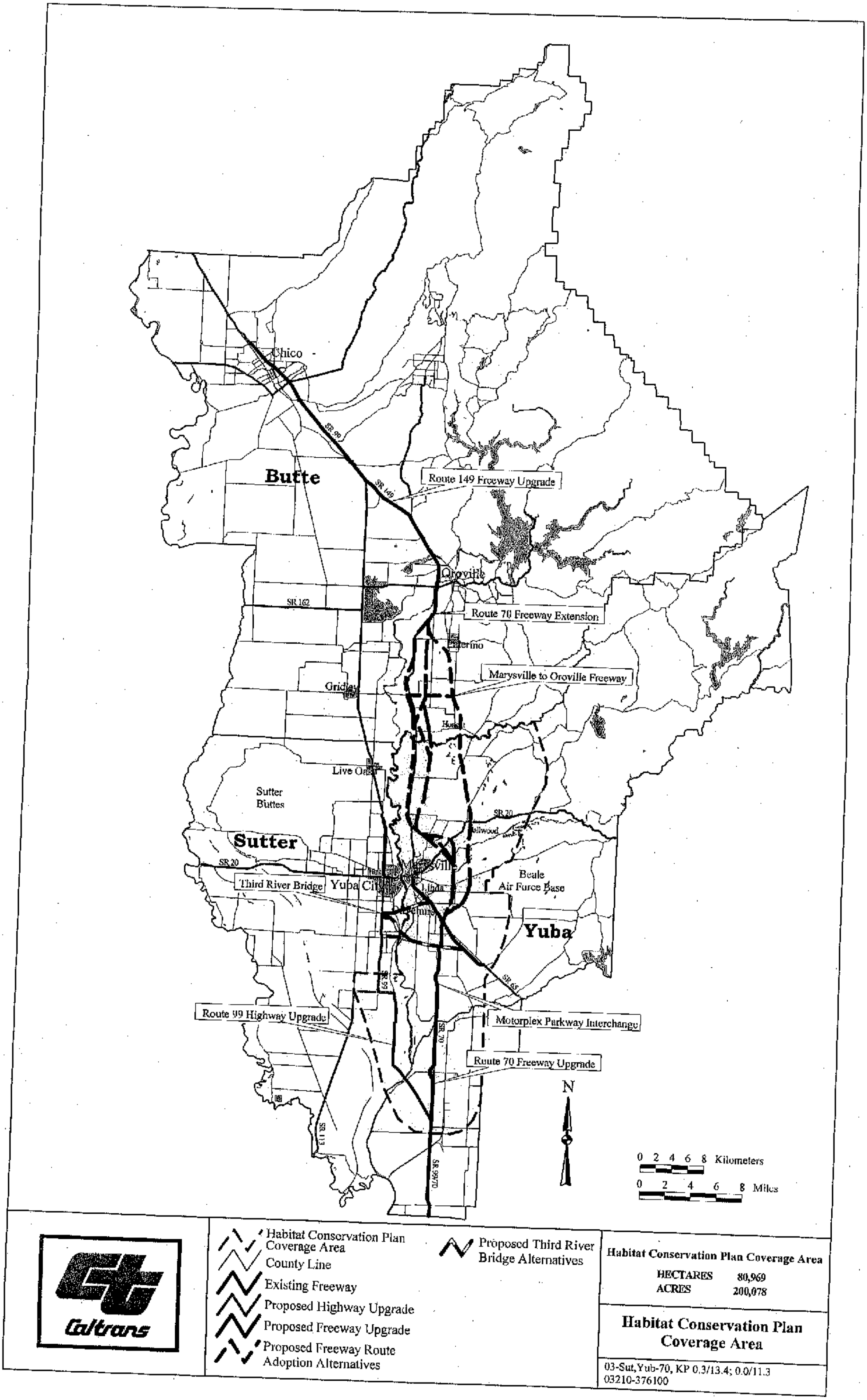
Chico
SR 99
Butte
SR 149
Route 149 Freeway Upgrade
Oroville
SR 162
Route 70 Freeway Extension
Marysville to Oroville Freeway
Gridley
Live Oak
Sutter Buttes
SR 20
Sutter
SR 20
Third River Bridge
Yuba City
Beale Air Force Base
Yuba
SR 65
SR 99
Route 99 Highway Upgrade
Motorplex Parkway Interchange
SR 70
Route 70 Freeway Upgrade
SR 113
SR 99/70
N
0 2 4 6 8 Kilometers
0 2 4 6 8 Miles
Caltrans
Habitat Conservation Plan Coverage Area
County Line
Existing Freeway
Proposed Highway Upgrade
Proposed Freeway Upgrade
Proposed Freeway Route Adoption Alternatives
Proposed Third River Bridge Alternatives
Habitat Conservation Plan Coverage Area
HECTARES 80,969
ACRES 200,078
Habitat Conservation Plan Coverage Area
03-Sut,Yub-70, KP 0.3/13.4; 0.0/11.3
03210-376100

Figure 1

Caltrans

Freeway Upgrade Limits

Properties Acquired for Conservation

Existing CDFG Conservation Area

Base Map: USGS 7.5' Series Olivehurst, Wheatland, Sheridan, and Nicolaus quadrangles

Figure Bear River Conservation Area

Route 70 Freeway Upgrade

03-Sut,Yub-70, KP 0.3/13.4; 0.0/11.3
03210-376100

Figure 3. Proposed new conservation area and existing CDF&G conservation area.

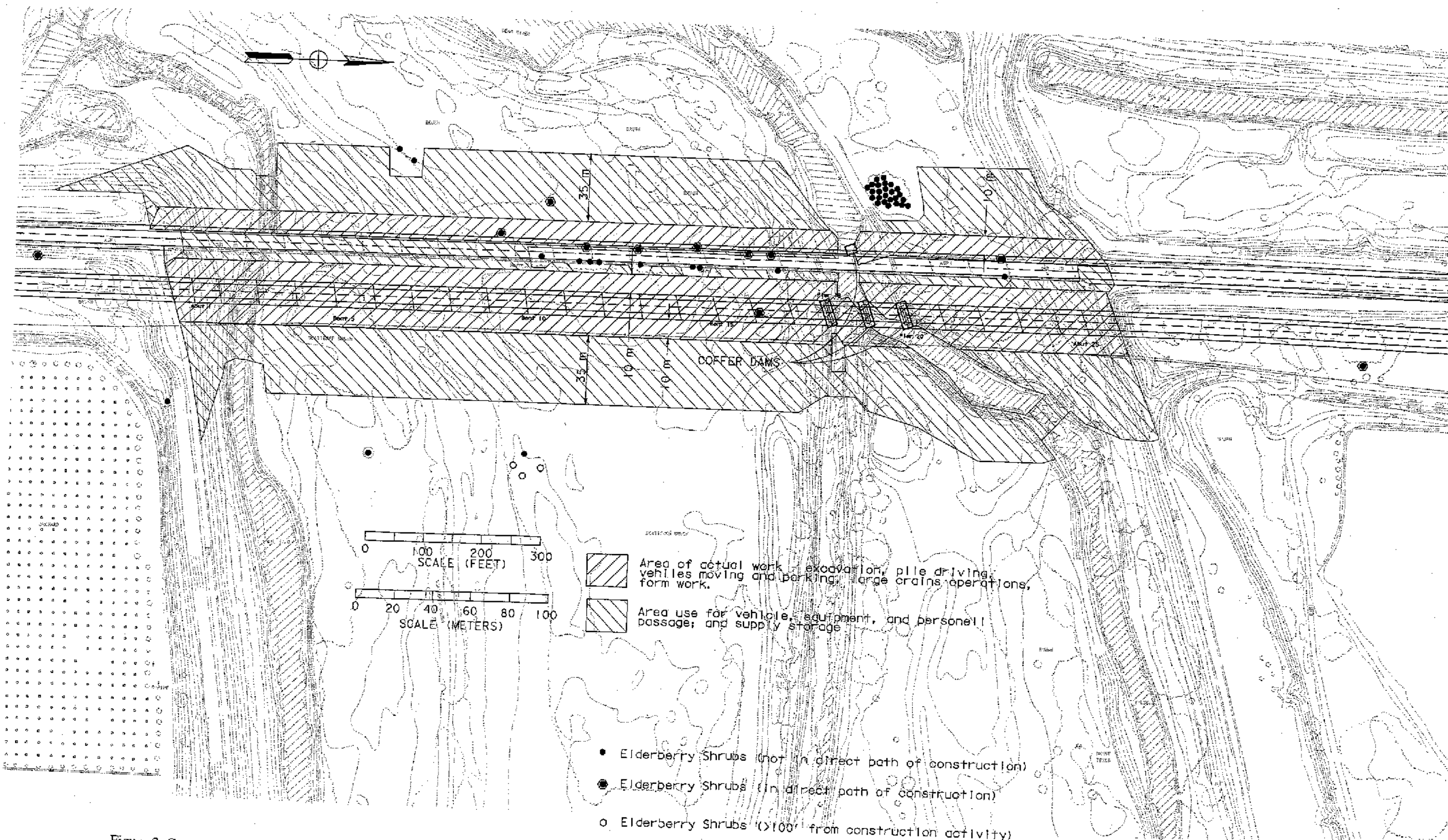

Figure 2. Conceptual schematic of the proposed new Route 70 bridge crossing the Bear River. Drawn by Caltrans.